AIR CONDITIONING HEATING AND VENTILATING

JUNE, 1958—55th Year

Air Conditioning for Electronic Data Processing Center
See page 63

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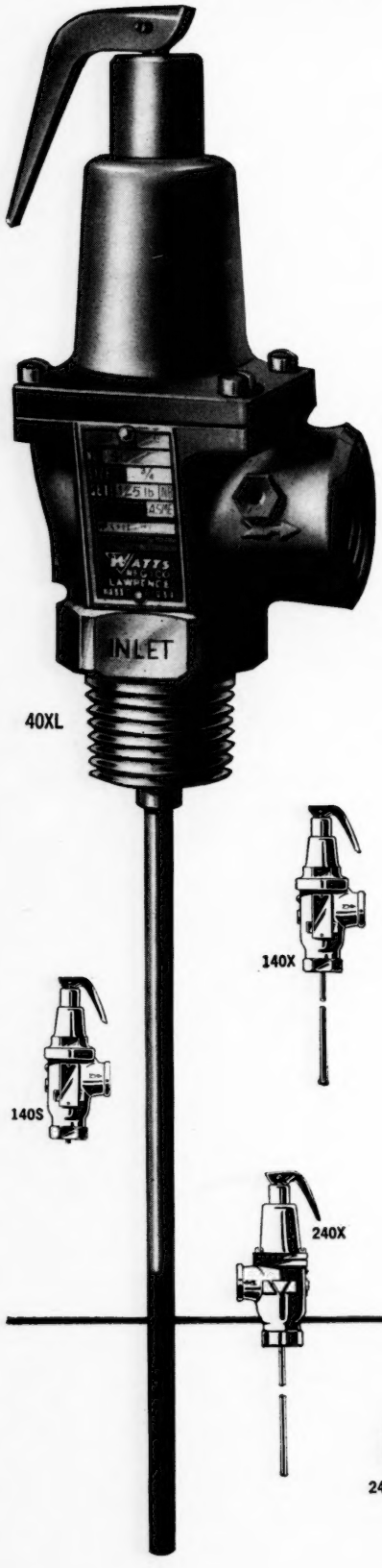


New
A.S.M.E., A.G.A. rated T&P Relief Valve an outstanding value

500,000 BTU/HR capacity meets all domestic and many other needs

Highest possible value is built into this new Watts automatic reseating type temperature and pressure relief valve. In fact, no other valve of equal quality or capacity is available at such an attractive price.

- Seat located *above* drain so water cannot be trapped and sediment cannot foul seat.
- Non-mechanical seat-to-disc alignment will not stick or freeze.
- Diaphragm seal of high temperature resisting, reinforced nylon material isolates spring working parts from water during relief.
- Powerful, solid wall, piston type thermostat impervious to lime or corrosion *assures* dependable temperature relief.

Write for complete information or see your wholesaler.

Watts Regulator Company, Lawrence, Massachusetts

Be on the safe side with

WATTS

Protection and Control Specialties

Why Every Steam Heated Unit Needs its Own Steam Trap

. . . the theory, practice and proof of "unit trapping" for top temperatures

Using an individual trap for each steam heated unit, including each separate coil, chest or chamber of a machine—pays off for the user. Here are just two examples:

1. On a creamery dryer

Drainage Method	*Air Temperature*
Restricted Blow-thru	250°
Group trapping (1 trap for 8 coils)	225°
Armstrong Unit Trapping (8 traps—1 for each coil)	**309°**

2. On a platen press

Drainage Method	*Processing Time*
Restricted Blow-thru	50 minutes
Group Trapping	35 minutes
Armstrong Unit Trapping	**25 minutes**

Why Unit Trapping Works Best

It is reasonable to assume that no two steam heated units will have *identical* condensing rates. Even the slightest difference in rate will cause a difference in steam pressure drops through the units. Here's where the trouble starts. Condensate from each unit may flow to the trap. But, what about air and other non-condensibles in the system? A difference in pressure drops too small to be indicated by an ordinary pressure gauge will permit backflow of steam from the higher pressure units to the lower pressure units. This backflow of steam may even impede flow of condensate from the lower pressure unit to the trap . . . and it will definitely impede or block off flow of air to the trap. The result is sluggish heating, reduced temperatures, reduced output, fuel waste and increased possibility of corrosion. Figures 1, 2 and 3 diagram the action.

Unit Trapping Not Costly

No engineer wants any more mechanical devices in his plant than are absolutely necessary. But, the moderate additional cost of using two or more small traps, instead of one big one, is saved over and over again in improved efficiency.

If the traps are Armstrong, maintenance is no problem. And users frequently tell us that Armstrong traps outlast others two and three to one.

Steam traps usually represent a fraction of 1% of the cost of the equipment they drain. Does it make good sense to lose 10% or more of equipment capacity to save a few dollars on traps?

Why not test Armstrong unit trapping in your plant. If you are not completely satisfied with the results you can return the traps for a full refund of the purchase price. There is little to lose—lots to gain. Call your local Armstrong Factory Representative or Distributor, or write **Armstrong Machine Works, 8466 Maple St., Three Rivers, Mich.**

ASK FOR the 44-page Steam Trap Book and reprint of article on Unit Trapping.

801ST

How Different Condensing Rates Can Slow Production

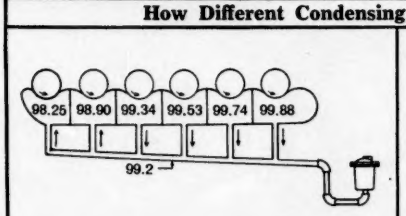


Fig. 1 This is a 6-roll ironer shortly after it has begun operating on 100 psi steam. When cold, wet material passes over chest 1, steam condensing rate is high and pressure drops accordingly. The pressure drop in chest 2 will not be as great, and so on down the machine as the material becomes progressively hotter and drier. Average pressure in the chests then is 99.27 lbs., and drain header pressure is slightly less, about 99.2 lbs. Under these conditions, steam from drain header enters chests 1 and 2 (as indicated by arrows at side of drain lines) because of pressure difference. Though condensate from chests drains by gravity, air can't leave chests countercurrent to incoming steam. Fig. 2 shows what happens next.

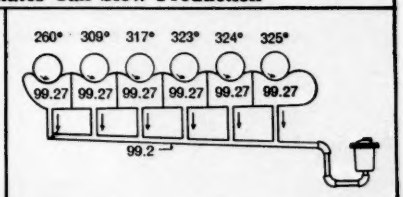


Fig. 2 This is the same 6-roll ironer after it has been operating a while. Air has accumulated in chests 1 and 2, reducing condensing rate and decreasing pressure drop. This process repeats itself down the line until pressures are as shown—that is, enough air will accumulate in each chest so that condensing rates and pressure drops of all chests will be about equal. The net result is shown in chest temperatures which are actual pyrometer readings taken on a 6-roll ironer, drained by a master trap, in a Chicago laundry. The laundry was making 337.9°F steam, but getting an average of only 309.6°F from the ironing surfaces, necessitating slow operation and frequent reruns. Then they tried Armstrong unit trapping—see Fig 3.

How Unit Trapping Prevents Trouble

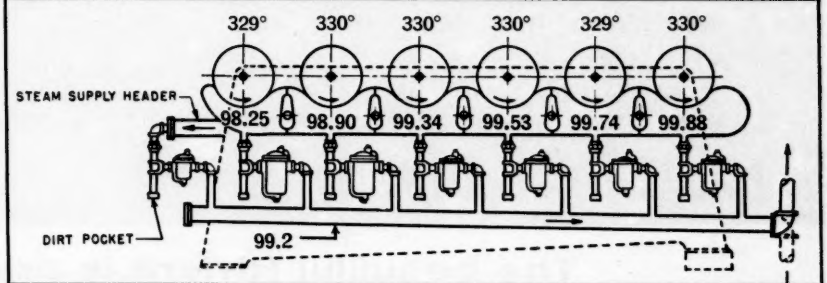


Fig. 3 This is the same 6-roll ironer, now unit trapped. Temperatures shown are also actual pyrometer readings—the average of 329.6°F is 20° higher than with group trapping. This is because air is continually removed from each chest into the drain header, and cannot get back into any chest.

ARMSTRONG STEAM TRAPS

PUT THE WARREN WEBSTER MAN IN YOUR PLANS

The beautiful Riviera is practical, too . . .

Here, in the beautiful Webster Riviera, you get modern HYDRONICS at its peak of comfort and practicality. Same distribution piping, winter or summer . . . heats *and* cools with water . . . no ductwork, ever . . . individual room control . . . and handsome cabinets that harmonize with decor in any hotel, motel, apartment, hospital, clinic, office, or home.

Now, with the Webster Riviera, you can combine year-long comfort in a central system . . . easily converted for winter or summer operation. Wide choice of vertical, horizontal, or concealed-type cabinets in five capacities from ⅓ to more than 1½ ton cooling capacity.

WEBSTER'S FINEST PRODUCT

For luxury comfort at an economy level, get the Riviera facts from your Warren Webster Man. Call him today . . . or write for Bulletin B-2001. Warren Webster & Company, Camden 5, New Jersey. Since 1888. Offices in principal U.S. Cities and Canada.

the Warren Webster Man

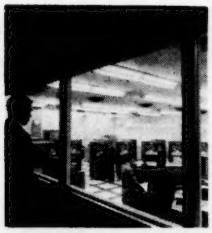
WARREN WEBSTER

HEATING . . . COOLING

AIR CONDITIONING HEATING AND VENTILATING

Volume 55, Number 6 June, 1958

THE COVER



Photograph taken from viewing gallery showing some of the equipment in electronic computer room, Hawthorne Plant, Western Electric Company, Chicago, Ill.

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HIGH SPOTS

Building construction costs, notwithstanding market weaknesses general across the United States, rose another 2% for the twelve months ending in March. All of this came about in the first half of the period. Since then there has been enough price deterioration in retail quotations to builders for items of building materials, equipment, appliances, and accessories, to slightly more than offset the impact of higher wage rates to building trades craftsmen.

On the basis of information received from several hundred contributors in 48 States, Myron L. Matthews, manager-editor, the Dow Real Estate Valuation Calculator, F. W. Dodge Corporation, says it is reasonable to expect that the cost to build almost anything from a cottage to a skyscraper will rise at a rate of about 1% every four months, or 3% for twelve months. However, things are in such uncertain balance that a moderate drift in psychology could change the outlook one way or the other, almost overnight.

Construction costs are 149% higher than in prewar 1941, Mr. Matthews states. This is a national average, and in some places material and wages are substantially lower than New Yorkers pay. Extremes are: Greenville, S. C., 40% less; Montgomery, Ala., 39% less; Raleigh, N. C., 36% less. Generally, costs average 12% under New York, compared to 10% six months ago, but this can be a dangerous figure to use, he points out, since it is the product of flattening out many places whose costs run from equal to New York to considerably less.

From overnight cabins, prior to World War II, the motel industry has grown to 58,000 establishments in North America, and its rate of growth increases. Scheduled new construction is one and a half that of 1957. Average cost per room unit is eight thousand dollars.

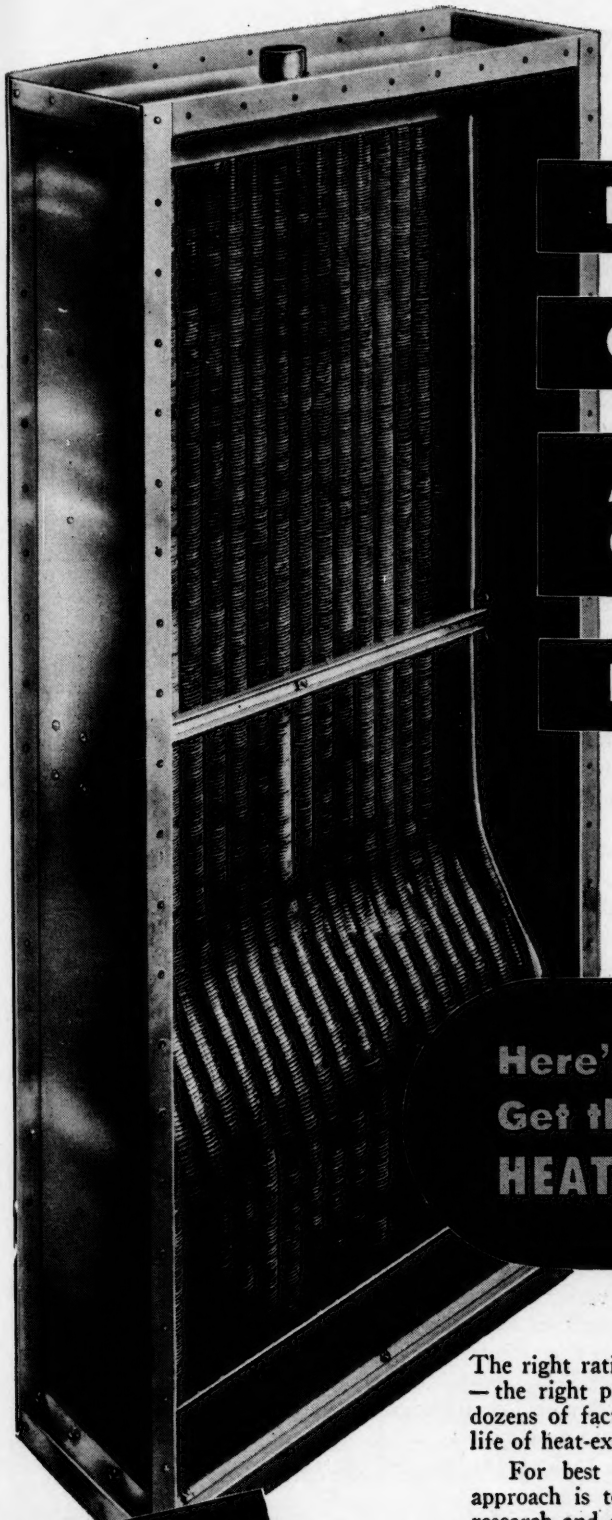
The recent Dupont study on the role of air conditioning in commercial and industrial concerns (see News of the Month, page 132) pointed out the fact that the majority of these concerns felt that they "could not afford air conditioning." But this same majority had no real idea of what it actually would cost to air condition their place of business.

The answer to this problem by Worthington Corp., Harrison, N. J., is a scheduled series of special advertisements in New York, Philadelphia, Atlanta, and New Orleans papers in which typical air conditioning costs, including product and installation costs, have been figured on a square foot basis. For a prescribed square foot area a range of cost will be shown to cover simple and complicated installations.

The dominant feature of these ads is a cost chart which will give the commercial or industrial prospect an immediate idea of what it will cost to air condition his store, office or plant.

The Atomic Energy Commission has issued a license to Isotopes Specialties Company, Inc., Burbank, Calif., authorizing the company **to collect and dispose of atomic waste materials.** The proposed license will cover byproduct material (radioisotopes) and source material (uranium and thorium). The company is authorized to gather waste materials from Commission-licensed users and to dispose of the material at sea in at least 1,000 fathoms of water. Waste materials are to be disposed of at sites selected with the U. S. Coast Guard which are outside normal shipping lanes. Materials are to be packaged in containers (usually 55-gallon barrels) heavy enough to insure sinking to 1,000 fathoms.

At least 10 days before each disposal the licensee must notify the Commission giving details of the planned disposal. This procedure allows review of the proposed location by the Commission. The licensee will also notify the Coast Guard and the State of California of the planned disposal. Disposal of radioactive wastes in the manner proposed by Isotopes Specialties Company, Inc. is believed to be a safe method. At 1,000 fathoms the waste containers should not be affected by ocean currents. Also, there is no fishing at depths of 1,000 fathoms or greater. The packaging of the waste is such that there should be no release of material for a number of years. If the material is released, it will be at a very slow rate and will be diluted to harmless amounts by the tremendous volume of sea water.



Heating?

Cooling?

Air Conditioning?

Process?

Here's How to Get the RIGHT Answer to your HEAT-EXCHANGE PROBLEMS

The right ratio of surfaces – the right materials – the right velocities – the right proportion between coil area and depth . . . there are dozens of factors that affect the efficiency, maintenance and service life of heat-exchange coils.

For best performance in your own application, the practical approach is to take full advantage of the unequalled engineering, research and design skill – the unequalled manufacturing and testing facilities – which Aerofin offers you.

To get the *right* answer – ask the Aerofin man.

Aerofin is sold only by manufacturers of nationally advertised fan system apparatus. List on request.

AEROFIN CORPORATION

101 Greenway Ave., Syracuse 3, N. Y.

WASHINGTON OVERTONES

by LORING F. OVERMAN

● Washington was overshot with overtones as Spring merged into Summer.

Latin America's reaction to Vice-President Nixon was sparking a reappraisal of Western Hemisphere relations.

France's future as a Western power was in question.

Strained Middle East relations were causing Washington to ask, "What did we do wrong?"

Russia's outsize sputnik was needling the Department of Defense again.

● US recession overtones were being heard by Washington as requiring either increased Federal expenditures or (as a last resort) a tax cut; by many consumers as solvable through a price and wage freeze.

Government planners hold that more money will unfreeze purchasing power; purchasers point out that better values will unloose the tightened purse strings.

Federal handouts and tax cuts being more popular than price and wage controls, current indications are that members of Congress will make an extra effort to do the "popular thing" in an election year.

● Pressed for a statement regarding tax reduction, the President at a recent news conference pointed out that some action must of necessity be taken prior to June 30. On that date there will be an automatic drop in corporate income tax rates, and in some excise taxes, unless present "Korean War emergency rates" are continued.

Meanwhile, Washintgon is wondering whether the recession is actually being extended because there has been no announcement of the Government's intent, taxwise.

Senator John Marshall Butler (R-Md.) sums it up by saying that thousands of people are deferring vacations, as well as the purchase of automobiles and other major items, in the belief that there will be a worthwhile reduction in excise taxes.

One proposal, by Senator Warren G. Magnuson (D-Wash.), would result in a price reduction of $4-billion by repealing the 3% excise on freight; the 10% excise on travel rates, and by suspending for one year the 10% excise tax on automobiles and some other major consumer items not moving.

Senator Hubert Humphrey (D-Minn.) believes the solution lies in a retroactive (to May 1) tax reduction of 10% on passenger cars; 5% on trucks. Cost to the Treasury would be $200-million, but all or most of this would be made up, the Senator believes, in the chain reaction or consumer purchases which would follow.

● Washington's interest in tax reduction is dimmed somewhat by the Budget Director's forecast of an $8-billion to $10-billion deficit for fiscal 1959—in addition to an expected deficit on some $2-billion for fiscal 1958.

Said Budget Director Maurice Stans: "Our income is down, our defense costs are up, anti-recession measures are under way, and deficits of serious proportions confront us. Simple prudence compels us to rethink our work program and to look critically at each of the additional expenditures proposed."

If there be any tax relief, small business will be the first to know. Senator Edward J. Thye (R-Minn.), speaking before the small business forum of the American Management Association, said he expects:

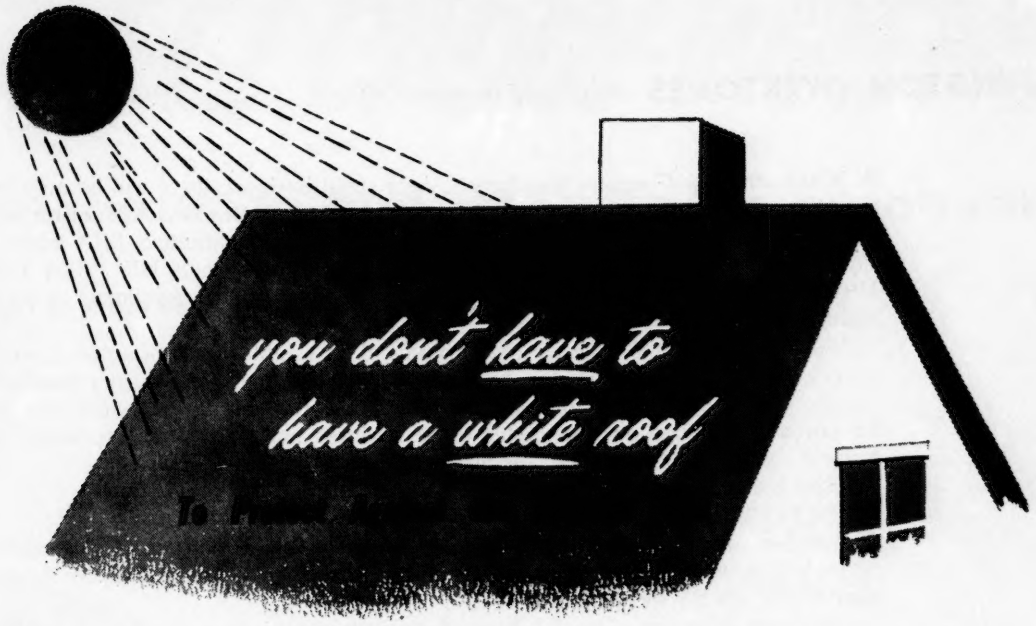
—allowable deductions of up to $30,000 invested out of income for increased inventory or depreciable assets;

—allowable deduction by individuals of up to 10% of income, or $1,000 per year, whichever is less, to accumulate funds to pay estate taxes over a 10 year period.

—provision for accelerated depreciation of used machinery and equipment, at rate of up to $50,000 per taxable year.

The Senator explained that such a program would give quick assistance to small business, but would also provide for its strengthening and continued growth.

(Continued on page 8)



The summer sun pours down as much as 250,000 Btu's of heat per hour on a 1,000 sq. ft. roof of a house at noon on a clear day. Some white shingles can reflect, OUTDOORS, about 55% of the sun's rays; yellow shingles 35%, green 15%, red 14%, blue 5%, black 4%.

White shingles won't always stay white, don't always harmonize with the color-scheme, easily look soiled. So despite the greater efficiency of white (which is true only OUTDOORS), roofs may nevertheless be ANY color; and the house will still be considerably cooler than the outside; IF MULTIPLE REFLECTIVE spaces and reflective surfaces are installed beneath the roof.

The comfort and efficiency of this scientific combination, produced by multiple sheets of aluminum and fiber, air-spaced apart, is remarkable for its effectiveness in repelling radiation, which is responsible for about 93% of all *heat in-flow* down from the roof to living quarters. The surfaces of the aluminum reflect radiation with a 97% rate, and absorb and emit radiation at a rate of only 3%.

Since there is NO convection in down heat flow, and slight conduction through low density air spaces, a triple barrier to *heat in-flow* is raised. Summer coolness and comfort are enhanced, night and day, often 15° F cooler than the shade outdoors, for the slight cost of the *insulation alone.*

ALSO RETARDS WINTER HEAT LOSS

In winter too, this form of insulation is effective, because 55% to 70% of heat flow upwards through air space is by radiation. Convection, ranging to 45%, is retarded by the multiple aluminum sheets. In up heat flow, conduction is also slight because of air's low density.

The best shingles or most beautiful paint job on the exterior or interior, will not protect against peeling paint, timber rot, and crumbling plaster caused by destructive condensation.... The multiple aluminum, almost impervious to water vapor, minimizes condensation formation on or within it by its scientific construction.

How solar rays which strike the outside of a building become heat rays which oppress those inside; why white paint, and other white surfaces in *enclosed* places perform no better than black in reflecting heat, are interestingly discussed in Schwartz's 48-page informative, authoritative, readable manual: "Heat Flow by Radiation in Buildings." You'll really enjoy reading it; use the coupon.

THERMAL VALUES*, INFRA RECTANGULAR INSULATIONS
Non-metallic Insulation Equivalents†

	UP-HEAT	DOWN-HEAT	Cost, Installed‡
TYPE 3	C .143=2⅓"	C .046=**7⅕"**	6¢ sq. ft.
TYPE 4	C .105=**3⅕"**	C .038=**8⅔"**	8¢ sq. ft.
TYPE 5	C .081=4"	C .034=9½"	9¢ sq. ft.
TYPE 6	C .068=4⅘"	C .034=9¾"	10¢ sq. ft.
TYPE 9	C .043=**7¾"**	C .029=**11¼"**	15¢ sq. ft.

Types 1, 2, 7, 8 also available

*Determined by method of National Bureau of Standards in H.H.F.A. Research Paper 32.
†Calculated on basis of limiting thermal values cited in Fed. Specs. LLL-I-321b; HH-I-585; HH-I-521c; HH-I-551a.
‡Approximate cost, material and labor, new construction between wood joists.

CAN BE PURCHASED THROUGH YOUR PREFERRED LOCAL DEALER

Infra Insulation Inc., 525 Bway., N. Y., N. Y. Dept. V-6
Please send "Heat Flow by Radiation."

NAME_____

FIRM_____

KIND OF BUSINESS_____

ADDRESS_____

WASHINGTON OVERTONES *(Continued from page 6)*

● Whatever plans Congress may have to help small business, there will be no new agency to provide such aid if the present head of the Small Business Administration has his way. Testifying before the House Small Business Committee, SBA-administrator Wendell Barnes supported HR 12057, and opposed bills HR 12064 and HR 12182. These would set up a new agency to administer equity financing programs for small business.

"I cannot justify and hence cannot recommend the establishment of a new federal agency to initiate and administer the program contemplated," Mr. Barnes testified. "In the case of equity financing the investor is protected only to the extent that he has correctly analyzed the potentiality of the business and is granted an opportunity to have a voice in the control of the management.

"This is a function for which government is ill adapted."

● Another effort to define small business is in the making. Purpose of the redefinition is to serve as a guide in placing government contracts. Representative Abraham Multer (D-NY) explained:

"A proper definition of small business for procurement is long overdue. It is time that a truly definitive definition is established."

● National Association of Home Builders told the Senate Banking Committee that an average 10% increase in housing starts is contemplated by builders in 1958. Discussing pending construction legislation, the NAHB spokesman:

—opposed S 2791 creating a Home Loan Guarantee Corporation, because authority is limited to one class of lending agencies (savings and loan associations). The American Bankers Association opposed the legislation for the same reason, while the U. S. Savings and Loan League favored it because it would "stimulate home construction, improve our national economy, and extend home ownership."

—favored increase in maximum FHA mortgage ceilings; aid for tradeins; increase in Federal National Mortgage Association secondary market authority; and increased FHA insurance authorizations.

● Housing Administrator Alfred M. Cole has asked the Senate Banking Committee for emergency action to boost by $4-billion a year the FHA's mortgage insurance authority. S 3399, the Administration's general housing measure, calls for a $3-billion increase. Other features of S 3399 recommended by Cole:

—increase to $30,000, the maximum mortgage for one to three-family dwellings financed under FHA's sales housing program.

—increase statutory interest rate ceiling to 5½% for both rental and cooperative housing.

—increase mortgage purchase authority of FNMA to $20,000 per dwelling unit, from present $15,000.

—provision for financial assistance other than grants for urban renewal projects which do not meet "predominantly residential requirements."

—one-year extension for low-rent housing programs totalling 70,000 units.

—change Section 221 program (relocation housing) to provide that rental housing produced under the program could be undertaken for profit by builders. At present, only nonprofit organizations may sponsor 221 rental housing.

● Testifying before the House Banking Committee (studying Senate-approved S 3497 authorizing $1-billion in loans and HR 11474 authorizing $2-billion), FHA-administrator Cole opposed such direct loans for community facilities.

He considered the legislation undesirable "because it would largely substitute federal funds for available private funds, and the effect would be too delayed to accomplish its anti-recession purposes."

He also opposed HR 6215, an area assistance bill, chiefly because it would set up a new independent agency to make loans for business facilities in depressed areas. He considered this an unnecessary duplication.

FREE! CADDY-WRENCH

from June 1 to August 1 with the purchase of any cylinder of genetron® 22

It's a wrench!
Fits "Genetron" cylinder valve stems and valve outlet caps—also fits stems of compressor service valves, soldering gas cylinders, etc.

Comfortable finger grips

1/4" tool steel, smooth plated finish

It's a carrying tool! Fits bonnet hole on small "Genetron" cylinders

Here's a tool you've never seen before—specially designed for the service engineer by General Chemical. It's a combination carrying tool and wrench. We call it a "Caddy-Wrench." And, like the "Jug-a-Lug" which we created for you two years ago, this is a tool that's really helpful, really useful.

Many uses! As a carrying tool, the "Caddy-Wrench" makes it easy to carry small size cylinders by the hood. *No more cuts, strains and finger injuries!* And as a wrench, it's designed to fit "Genetron" cylinder valve stems and valve outlet caps, also stems of compressor service valves, soldering gas cylinders, etc. *No more adjusting wrenches or using different tools, once you have this all-purpose cylinder wrench and carrying tool!* Made of quarter-inch solid tool steel, it's strong, sturdy, won't crack, bend or break. And the smooth plated finish makes it a pleasure to use. Be sure you get *your* "Caddy-Wrench"! *Here's the only way to get one:*

SEE YOUR WHOLESALER! When you buy any size cylinder of "Genetron" 22—*between June 1 and August 1 only*—your wholesaler will be glad to give you your "Caddy-Wrench" . . . *free!*

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, New York

BRIEFLY STATED

WITH THE ENGINEERS—The firm of SEELYE STEVENSON VALUE AND KNECHT, CONSULTING ENGINEERS, New York, N. Y., announces the admission to partnership of Williams D. Bailey, C.E. Mr. Bailey was formerly an associate of the firm, and will continue to act as manager of the Highway Engineering Division. The firm will continue its practice of general consulting engineering under the firm name of Seelye Stevenson Value & Knecht . . . WESTCOTT & MAPES, INC., ARCHITECTS AND ENGINEERS, New Haven, Conn., announce that Carl W. Taylor, secretary of the firm, has been made executive vice-president. He will be in charge of all architectural and engineering services performed by the firm. He is also a member of the partnership of Mapes, Taylor, Thompson & Westcott, which handles highway engineering work and general engineering in some states . . .

Dudley Deane was elected vice-chairman of the Building Industries Conference Board, San Francisco, Calif. His firm, DUDLEY DEANE AND ASSOCIATES, CONSULTING ENGINEERS, has recently completed the mechanical and electrical work on the Bay-Fair and Valley-Fair Shopping Centers in San Leandro and San Jose, the San Jose City Hall, and the Masonic Temple in San Francisco. The firm is presently at work on the Bethlehem Steel office building in San Francisco, Kaiser Center in Oakland (to be the largest office building west of the Rocky Mountains) and other Bay Area projects . . .

WILLIAM H. BOND, CONSULTING ENGINEER, announces that his offices are now located at 203 Cookston-Smith Building, 3603 Lemmon Ave., Dallas 19, Tex. . . . ALBERT C. MARTIN AND ASSOCIATES, ARCHITECTS AND ENGINEERS, Los Angeles, Calif., now associated with FRANK L. HOPE AND ASSOCIATES, San Diego, on the new May Company Mission Valley Shopping Center, has disclosed some staff appointments. Three new associates, Ward W. Deems, Chancy M. Lott, and Fred A. DeNisco, and a new design appointee, Karl Klokke, are representative of the younger group working with the partners Albert C. Martin, Jr., and J. Edward Martin . . .

George H. Miehls, president of ALBERT KAHN ASSOCIATED ARCHITECTS AND ENGINEERS, INC., Detroit, Mich., since the passing of the founding Kahn brothers in 1945, and chairman, since that post was created in 1956, has relinquished the presidency of the firm to devote full time to the positions of chairman of the board and treasurer of the firm. Sol King, with more than 23 years with the 64-year organization, has been elevated to the presidency from his former post as a vice-president of the firm. In 1948, when membership in the firm was first opened to key employes other than those admitted to partnership as associates of the founder, Albert Kahn, Mr. King was made a member. Mr. Miehls is the recipient of the Distinguished Alumnus Award by Ohio State University. The faculty of its College of Engineering cited his outstanding distinction in the profession of engineering and its allied fields.

WITH THE INSTITUTES AND ASSOCIATIONS—D. V. Petrone, president of Typhoon Air Conditioning Company, Division of Hupp Corporation, was elected president of AIR-CONDITIONING AND REFRIGERATION INSTITUTE, Washington, D.C., at the annual meeting of ARI's Board of Directors in Hot Springs, Va. Elected to succeed him in the vice-presidency is Rudy Berg, vice-president of Copeland Refrigeration Corporation, who has served as ARI treasurer for the past year. The new treasurer is L. N. Hunter, senior vice-president for engineering and research, National-U.S. Radiator Corporation. The three newly elected officers, together with Lud Emde, president of Temprite Products Corporation, as immediate past president, and ARI managing director, Geo. S. Jones, Jr., will make up the organization's executive committee for the coming year . . .

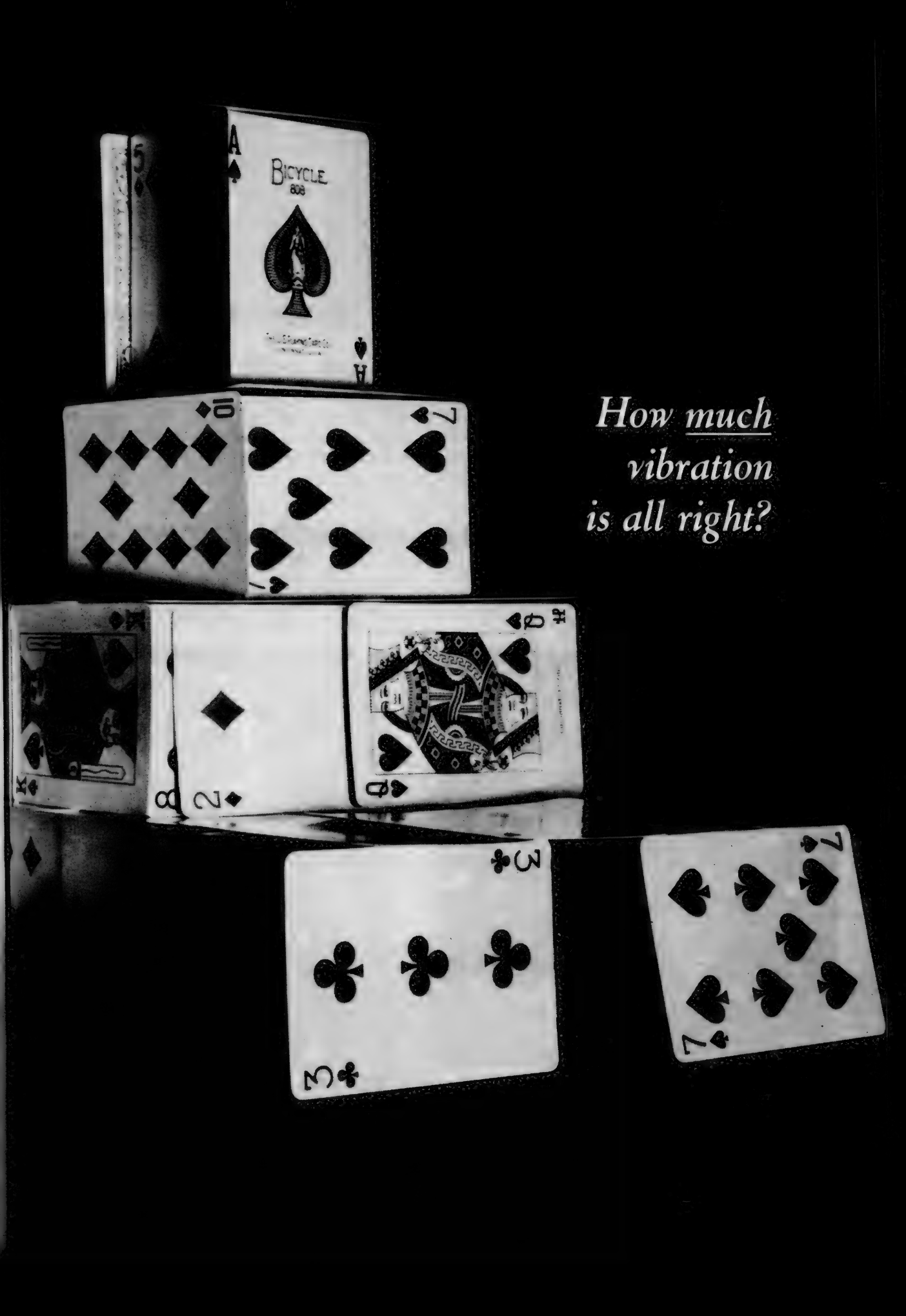
Formation of a section for manufacturers of room air conditioners within the National Electrical Manufacturers Association, New York, N. Y., was announced. J. B. Ogden, general manager, Air Conditioning Div., Whirlpool Corporation, was elected temporary chairman at a meeting attended by representatives of Kelvinator, Fedders-Quigan, Frigidaire, GE, Hotpoint, Philco, O. A. Sutton, Westinghouse, and Whirlpool . . .

T. J. Hull assumed new duties as executive secretary, NATIONAL ASSOCIATION OF CORROSION ENGINEERS, Houston, Tex. R. W. Huff, Jr., became assistant executive secretary. Mr. Hull had been assistant executive secretary for the year preceding. A. B. Campbell, formerly executive secretary, has retired. During his incumbency, from 1946, membership in NACE grew six-fold.

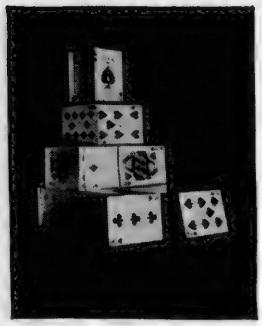
BURGEONING BUSINESS—SARCO MANUFACTURING CORP., Bethlehem, Pa., and SARCO CO., INC., New York, N. Y., announced construction of a factory wing at the Bethlehem site, which will be devoted exclusively to the manufacture of the company's Thermo-Dynamic steam traps. Approximately 50% greater production facilities will be available for this item when the new building is completed this summer . . . A brick and steel manufacturing and repair plant at Glassport, Pa., is being constructed by WESTINGHOUSE ELECTRIC CORP., Pittsburgh, Pa. Scheduled for completion about December 1, it will be one of the largest of its type in the country. R. L. Bogardus will be manager.

• Warren Webster, president of WARREN WEBSTER & CO., Camden, N. J., presided as chairman of the recent national meeting of the Government Contracts Committee of the National Association of Manufacturers, held in Beverly Hills, Calif. The Committee seeks to assist in the improvement of government defense contracting procedures, policies and practices. Its work is concerned with such problems as contract termination, mobilization and survival planning, the place of small business in government contracting, and other matters pertaining to military procurement of goods and services.

(Concluded on page 14)


BICYCLE
808
How much
vibration
is all right?

HOW MUCH VIBRATION IS ALL RIGHT?



When it's ventilating equipment...

When *you* specify ventilating equipment, what do *you* consider most important? What features do *you* insist on? What contributes most to the quality of equipment *you* want?

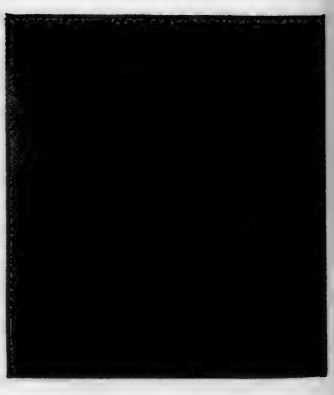
To nail down these answers for us, an independent research organization conducted a nationwide survey among consulting mechanical engineers.

Here's how ILG *fans and motors, stay vibration-free*

Full Speed Ahead — and still not a ripple in the water. With Ilg direct-connected propeller fans you get operation as *vibration-free* as it's possible to be. Ilg's "One-Name-Plate" pledge of performance covers *both* the dynamically balanced, patented Type "Q" fan wheel and the permanently lubricated, self-cooled motor.

Ready with the Rotor! All rotating *parts* in Ilg-built motors are checked for static and dynamic balance. After final assembly, Ilg Motors undergo additional checks. Smooth, *vibration-free* operation assures long life—and a quiet one—for *all* Ilg Motors.

Checks and Balances. Ilg Centrifugal Fan Wheels—with Backward Curved (BC) Blades and Airfoil design—have to "check out" before being direct-connected to 3-phase or permanent-split capacitor, single-phase Ilg-built motors.



For fans built to satisfy your "specs"...

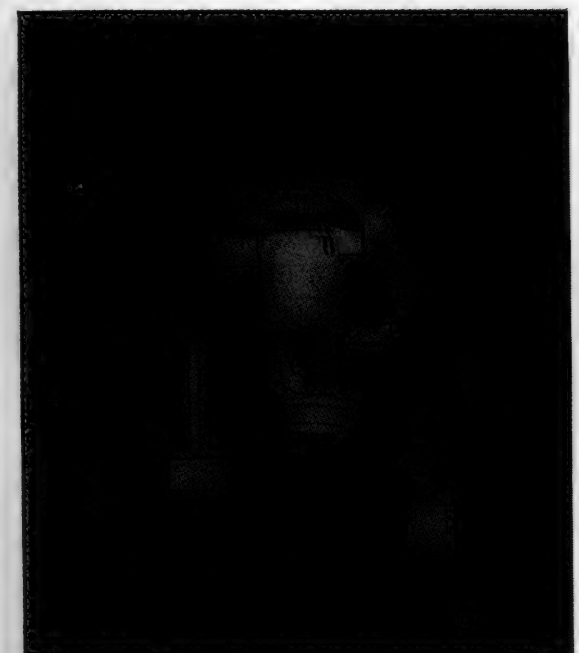
consulting engineers vote for vibration-free fans on 9 ballots out of 10

Results of the poll? Nine times out of ten *vibration-free operation* ranks foremost among those who specify fans and ventilating equipment.

As shown below, Ilg Fans and Ventilators are as *vibration-free* as it's possible to be. But that's only *one* reason why it pays to choose Ilg. Not to be overlooked are these additional points preferred by consulting engineers: minimum maintenance, low operating costs, ease of repair, quietness.

For further details of why Ilg rates so high with those who specify, send for Catalog No. 153 on propeller fans, Bulletin No. 257 on Airfoil centrifugals, Bulletins 2301 and 2700 on power roof ventilators.

ILG *power roof ventilators cost less to operate*



Look Under the Hood of this Ilg Power Roof Ventilator and you'll see why it's such a popular purchase. Ilg Backward Curved Aluminum Airfoil Centrifugal Fans assure smooth, quiet air flow and low shock loss. Permanently lubricated, self-cooled, direct-connected Ilg Motors eliminate belt maintenance, friction losses, slippage.

David and Goliath? Just name the exhaust or supply propeller fan power roof ventilator that fits your capacity and kind-of-building needs—and Ilg has it. 11 different sizes, all direct-connected fan and motor for quiet, *vibration-free* operation and low maintenance. All components dynamically balanced for lifetime alignment.

specify ILG **ILG ELECTRIC VENTILATING COMPANY**
2851 N. Pulaski Road, Chicago 41, Ill.
Offices in 57 Principal Cities

BRIEFLY STATED

(Concluded from page 10)

NEW SHOOTS—FRED M. ERICHSON, New Orleans, La., has expanded his representation of AMERICAN AIR FILTER products to include Herman Nelson heating and ventilating products . . . WORTHINGTON CORP., Harrison, N. J., has appointed DEKE JONES CO., Detroit, Mich., as wholesaler of its air conditioning equipment in Michigan . . . R. B. Grisbrook, REFRIGERATION COMPONENTS CO., St. Louis, Mo., is named refrigeration sales representative for MCQUAY, INC., Minneapolis, Minn., for Missouri, Kansas, southern Illinois, western Kentucky, and northern Indiana. He will handle McQuay refrigeration and OEM markets, and already represents Tecumseh Products Company. The company's heating and air conditioning division has announced the appointment of HAROLD O. KNAPE & CO., Houston, Tex., as sales representative . . .

DUNHAM-BUSH, INC., West Hartford, Conn., has appointed SERVICE PARTS CO., Melrose Park, Ill., as exclusive distributors for both the Dunham-Bush and Brunner lines of air conditioning and refrigeration products in the metropolitan Chicago area.

AMONG THE MANUFACTURERS' PERSONNEL—R. O. Gundlach is appointed regional sales manager of all WORTHINGTON air conditioning and refrigeration activities in the Midwest region with headquarters in Chicago; Joseph Goldstein is appointed staff engineer of headquarters engineering, his first assignment being with the Air Conditioning and Refrigeration Division at Holyoke, Mass.; and the company's Board of Directors have announced the election of Frank J. Nunlist as group vice-president of both the Air Conditioning and Mueller Climatrol divisions . . .

William F. Zunker is appointed sales manager, Industrial Boiler Div., CLEAVER-BROOKS CO., Milwaukee, Wis. During the Korean conflict, he was contract supervisor for the Boiler Division, working with the Bureau of Ships and Bureau of Yards and Docks . . . Donald L. Hinkson and Evan D. Graham are appointed branch managers, respectively, in Portland, Ore., and Seattle, Wash., by POWERS REGULATOR CO., Skokie, Ill.

E. Theodore Neubauer is the new vice-president in charge of engineering of COPELAND REFRIGERATION CORP., Sidney, Ohio. After receiving a Masters degree in 1933 from MIT, he worked with York Corporation and Trane Company, his major contribution being in the design of high speed reciprocating compressors . . . Addition of three field sales representatives is announced by U.S. GAUGE DIV., AMERICAN MACHINE AND METALS, INC., as follows: V. Dallis, branch manager in the Atlanta office; F. A. Hebenstreit, sales engineer in the Chicago office; and G. R. Preisick, Aircraft Sales, New York office . . .

Both Joseph F. Murray and Alvin Stolinsky will function as vice-presidents of READING TUBE CORP., New York, N. Y., and Reading, Pa. Mr. Murray has been general sales manager for the past eight years, and Mr. Stolinsky has been assistant general sales manager, having joined Reading in 1941 as a clerk . . . John P. Donnelly is appointed to the sales department of RESEARCH PRODUCTS CORP., Madison, Wis. He will headquarter in South Bend, Ind. . . .

G. V. (Pat) Patterson is appointed general manager of the VENTILATOR DIV., THE SWARTWOUT CO., Cleveland, Ohio. For the last 6 years he has served as sales manager for Jenn-Air Products Co., Indianapolis, Ind. . . . G. W. Brown, a vice-president since 1954, was elected executive vice-president of WAGNER ELECTRIC CORP., Saint Louis, Mo.; Paul C. Ford was elected a vice-president in charge of engineering and research; while R. H. Hackett is elected a vice-president in charge of manufacturing operations . . .

Carl R. Canfield is named to the newly-created post of chief engineer, product development department, CRANE CO., Chicago, Ill. The purpose of the new department is to develop new products . . . John J. Willis is elected a vice-president of ILLINOIS ENGINEERING CO., Chicago, Ill., subsidiary of American Air Filter Company. He will continue to serve as sales manager . . . KRAMER TRENTON CO., Trenton, N. J., announced the appointment of Otto M. Kershock as their sales representative covering the Philadelphia, Pa., area . . . DUNHAM-BUSH, INC., announced the appointment of Clark D. Akers as sales department manager for the Marshalltown, Iowa, sales office.

• After 38 years of selling air handling equipment, J. Crawford Donaldson, 70, Chicago, sales engineer in the Chicago branch office of AMERICAN AIR FILTER CO., Louisville, Ky., has retired. A native of Chicago, Mr. Donaldson was graduated from the old Lewis Institute of Technology, now the Illinois Institute of Technology. He joined the Autovent Fan and Blower Co., in September, 1930, as a salesman. Autovent was purchased in 1941 by the Herman Nelson Corporation. American Air Filter merged with Herman Nelson in 1949.

• SURFACE COMBUSTION CORP., Toledo, Ohio, regretfully announced the passing of its president, Frank H. Adams, and William J. Grover, who had been its marketing director. Mr. Adams, who was 72, was a past board member of American Gas Association and head of AGA's manufacturers' section. He was a leading member of Gas Appliance Manufacturers Association, and was a recipient of GAMA's distinguished service award as "one of the first persons to foresee the potential use of gas in industry." Mr. Grover had been on leave from the company since 1956. In 1934, he was loaned to People's Gas, Light and Coke Co., Chicago, where as division sales director, he took a leading part in one of the biggest gas heat merchandising programs ever initiated by a utility. He returned to the company in 1936 as advertising manager. The reference material he presented to The Janitrol Sales Clinic was used widely in formulating utility gas heating campaigns. He was active in both AGA and National Warm Air Heating & Air Conditioning Association.

READING TUBE CORPORATION

Empire State Building, New York 1, N. Y. • Plant: Reading, Pa.

Distribution Depots

READING, PA. CHICAGO, ILL. ATLANTA, GA. OAKLAND, CALIF. DALLAS, TEXAS
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Why do users of READING COPPER TUBE

Repeat and Repeat and Repeat?

Contractors who have ordered Reading Copper Tube recognize its quality as second to none. But they also know that their Reading Distributors get personalized "Shirt-Sleeve Service" from Reading and pass that service along with Reading products.

At Reading, every executive, from the president down, is ready for any emergency request. Red tape is cut and bypassing thru clerks is avoided.

As *specialists,* Reading makes a wide variety of copper tube and stocks it in huge quantities in depots thruout the U.S. As a result, your Reading Distributors can give you exactly the tube you want, exactly when you want it.

Because Reading "Shirt-Sleeve Service" has saved them time, money and headaches, more and more contractors are repeating and repeating and repeating.

On "Shirt-Sleeve Service" you can rely, if READING TUBE you specify!

MADE IN U.S.A. TO THE STANDARDS OF AMERICAN INDUSTRY

Scientific Frontiers

Utilization of New Energy Sources

The new sources of energy described in April and May on this page, while receiving attention from the standpoint of electric power generation in a world whose fossil fuel reserves are limited, especially in under-developed areas remote from power networks and fuel supplies, can be utilized in several applications other than generation of electric power.

Production of Fresh Water. Many countries have research projects designed to find methods for the low-cost production of fresh water. Solar energy has a prominent place among the energy sources considered for such production, though the use of thermal energy of the seas may effect lower production costs.

Production of fresh water in solar stills is a simple process involving evaporation of sea water or brackish water in flat plate collectors. Though solar stills appear to be economical in meeting small-scale demand in some parts of the world, solar-distilled water is at present too expensive for large-scale uses such as irrigation. Research now in progress is aimed at improving efficiency and at lowering initial investment and cost per unit of output.

A plant utilizing thermal energy of the seas may, as was indicated previously, turn out considerable quantities of fresh water as a joint product with electricity. Fresh water produced by this method would apparently be less costly than that produced by any other process known to be presently operating, providing that the jointly produced electricity has a favorable market. As electric prices are often high in areas short of water, suitable economic conditions for such a combined plant may be relatively easy to find.

Heating, Refrigeration, and Air Conditioning. Energy requirements for space and water heating, refrigeration, and air conditioning might be met, at least in part, by non-electric applications of solar energy and geothermic energy.

Geothermic energy can be used directly for house heating. As mentioned preciously, an outstanding example is found in Iceland where the homes of some 40,-000 people or one-fourth of the population, as well as greenhouses and swimming pools, are heated by natural hot water pumped approximately 10 miles from the wells. Elsewhere, geothermic energy is exploited for heating only on a small scale so far, partly because steam or hot water can be distributed only within a limited radius from the source.

The economic possibilities of using solar energy for house heating are limited by natural conditions. In the tropical zones where solar energy is most abundant, such heating is not required; in temperate zones least solar energy is available when it is most needed, and if solar radiation is to be the only heat source, the collector has to be made large enough to provide for the coldest period. Moreover, some heat storage facilities are needed for nights and cloudy days. A solar heating system could be combined with some form of cooling, such as a heat pump, and thus make possible a more economical operation. Practical work on air conditioning with solar energy appears to have started only recently, and the operation of prototypes has not yet been reported.

Refrigeration with solar energy is still in an early stage of experimentation. Two different methods are possible. In the first, a solar engine may be operated, like any engine, to provide power for compressing and liquefying a gas. With this method, the solar energy goes through several conversions and the intermittence of power supply is a disadvantage which is likely to limit the prospects of this form of solar refrigeration. The second and more unique method is based on absorption-desorption refrigeration; a simple focusing collector is used for two or three hours for heat regeneration of certain chemicals which may keep a box cold for 24 hours. Small, simple units of this type, requiring certain manual operations, may become available at a cost of less than fifty dollars. Larger units would be more expensive but still advantageous, particularly because they could be used in the absence of a supply of kerosene, gas, or electricity. More elaborate solar machines, based on the same principle, can produce ice.

Room in 50-year-old single home modernized into two apartments by Mr. Arthur Stockdale, Cleveland, Ohio, shows contrast between old and new in steam heating. Trim, compact SelecTemp unit at left (only 18" high) has maximum heat output of 12,000 Btu per hour. Built-in modulating non-electric thermostat controls forced circulation of filtered warm air.

Individual room-by-room temperature control now economical and practical

The Iron Fireman SelecTemp heating system has the basic economy and efficiency of steam heat, but with all of these added advantages:

A thermostat in every room. Occupants choose the temperature they prefer. More important, each room gets just the amount of heat it needs, regardless of heat from sun or fireplace or heat loss from cold winds.

Modulating heat control. The *volume* of heat is constantly adjusted to room needs—a little or a lot as required. No "on-off" cycling.

Amazing capacity in small space. SelecTemp compactness is due to the extremely efficient honeycomb copper heat exchanger, together with forced air circulation, delivering up to 120 cfm from the 12,000 Btu room unit (shown above), only 18" x 13⅝" in size.

For more information see catalog in Sweet's Architectural and Light Construction files, or mail coupon.

THERMOSTAT
AIR HEATING, FILTERING AND CIRCULATING UNIT
Each room heater is an automatic unit, with steam heating core, air filter, steam driven fan and non-electric thermostat. Recessed in wall; requires no floor space.
COPPER TUBING
Low first cost. Substantial installation savings in new or existing construction. Flexible copper tubing concealed in walls and floors. Uses low pressure steam from boiler or district steam.
STEAM SUPPLY
CONDENSATE RETURN

FOR BUILDINGS AND HOMES

SelecTemp installations now in use range from medium size homes to large office buildings with hundreds of room units. SelecTemp heating has proved widely adaptable. Churches can heat rooms for mid-week use without heating the entire building. Hospitals can meet patients' special needs, while non-electric fans and thermostats make SelecTemp units safe in operating rooms. Motels cut fuel bills by reducing daytime room temperatures; rooms are quickly reheated, as needed. In apartment buildings and dormitories, individual room thermostats end tenant complaints. Schools can keep the gymnasium cool and study and classrooms at the desired warmth. Homes can have cool sleeping rooms; warm bathrooms and nursery. Experience proves fuel and maintenance costs are low. Initial cost comparable to conventional hot water and steam systems, which do not have room-by-room control.

IRON FIREMAN®
Engineered **Heating and Cooling**

IRON FIREMAN MANUFACTURING COMPANY
3070 West 106th Street, Cleveland 11, Ohio
(In Canada, 80 Ward Street, Toronto, Ont.)

☐ Send SelecTemp specifications and full information.

☐ Arrange for brief demonstration of SelecTemp room unit; in actual operation, in our office.

Name_____

Firm_____

Address_____

City_____ State_____

How Cincinnati Plant Stops Valve Maintenance Problem

CRANE Valves End Excessive Shutdowns for Repairs

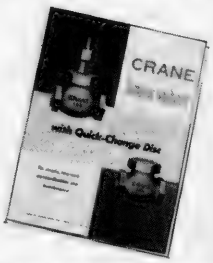
About every four months maintenance men of Sealtest, Central Division, Cincinnati, Ohio, had to replace worn, leaky discs and thread-stripped stems of valves used on the dairy's pasteurizing tanks.

The high cost of down time, labor and parts was only a part of this maintenance problem. Each time the valves had to be repaired, the dairy suffered a drop in production and faced the possible loss of 600 gallons of milk.

Upon recommendation, Crane No. 9 bronze globe valves, with quick-change composition disc, were installed. Today—two and one-half years later—these Crane valves, opened and closed a dozen times a day, have not cost the dairy one cent for repairs, or any loss in production or milk.

Here again is proof that Crane valve economy is never measurable in terms of first cost. You get it in years of maintenance-free service.

That's why more prudent buyers specify Crane valves for every service.



LEARN WHY Crane bronze valves with composition discs are so economical for service on steam, hot or cold water, oil or gas. Write to address below for Circular AD-2222.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

Now

ANEMOSTAT®

presents

Standardized Constant Volume

TURBULATORS

The Anemostat Constant Volume Turbulator is a standardized high capacity dual duct unit handling from 800 to 7000 CFM. It provides an economical solution to many air distribution problems in which a large volume of air at controlled volume or pressure, and temperature, is involved.

With the Anemostat system, all thermal functions—heating—cooling—ventilating—are accomplished with air. Coils and resultant coil lag are eliminated together with required piping. Pressure losses are low and so are noise levels. Quality-built Anemostat Turbulators function automatically. They are easy to install, simple to maintain.

Anemostat Constant Volume Turbulators provide zoning up to 7000 CFM with one set of controls—save money by replacing coil reheat zone-control with all-air system.

New Bulletin gives important engineering data on Anemostat Constant Volume Turbulators. Write for your copy today.

ANEMOSTAT®

DRAFTLESS *Aspirating* AIR DIFFUSERS

ANEMOSTAT CORPORATION OF AMERICA

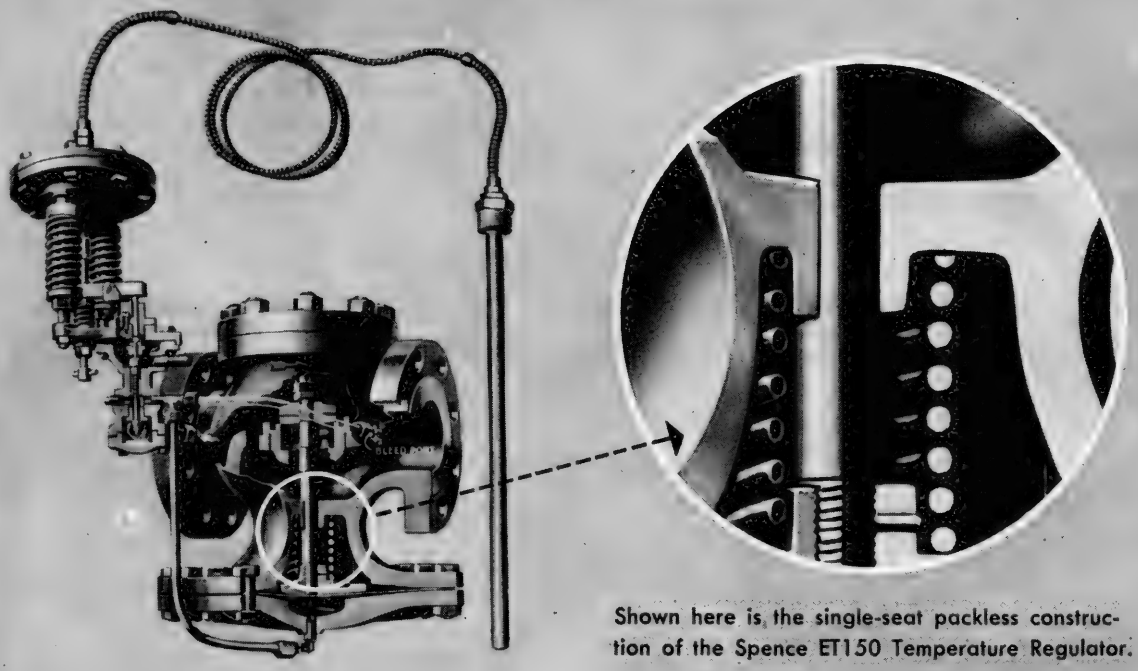
10 EAST 39th STREET, NEW YORK 16, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

AC1363

VALVE TIPS:

Advantages of Packless Construction in Temperature Regulating Valves



Shown here is the single-seat packless construction of the Spence ET150 Temperature Regulator.

One of the biggest headaches in regulating valve maintenance is repacking stuffing boxes.

How often a valve needs repacking, how much time it takes, and the cost of the system downtime all vary with the construction of the regulator and the service it's used for. No matter how you calculate all these variables it's still a headache—and an expensive one.

In the temperature regulator shown above (Spence Type ET150) stuffing boxes are eliminated. This is done by what is known as "balanced" diaphragm construction. You can see in the cutaway drawing that pressure is applied to both sides of the large metal diaphragm. The upper side is exposed to delivery steam pressure and the lower side is exposed to loading pressure applied by the pilot. When the pilot closes, both delivery pressure and loading pressure are equalized through the bleedport and connecting tubing.

This construction not only does away with repacking problems, but it makes possible additional savings as well. For example, you will note in the sectional blow-up that this design eliminates a closely fitted stem and guide. Dirt or other foreign matter doesn't have much of a chance to lodge between these parts and cause sticking.

Another cause of binding or sticking, uneven expansion of closely fitted parts, is also eliminated with this design. In addition, valve stem wear is reduced for the same reason.

Lower maintenance is not the only advantage of this packless construction. Accuracy of regulation is also improved because friction due to a stuffing box, dirt, or uneven expansion is not a problem. The large, *balanced* metal diaphragm is more sensitive to slight changes in pressure.

Guaranteed Not To Wiredraw

If seats and discs are cut by steam (wiredrawn) the loss of steam through these grooves can be another expensive item — directly charged against the regulating valve. Fortunately, you can eliminate these costly leaks by specifying a temperature regulator that is *guaranteed not to wiredraw.*

Spence makes such a guarantee because their seats and discs are made of SECO Metal. Over 20 years experience with this special alloy has failed to produce a single case where a SECO Metal seat or disc had been cut by steam. All that's required is an approved strainer located ahead of the regulating valve. Expensive steam leaks just can't happen with this combination of SECO Metal and single-seat design.

If you would like to have more information on Spence Temperature Regulators, drop us a line and ask for Bulletin T150. It gives more detailed information on these and other Spence design features. Piping layouts and helpful information on the installation of temperature regulators are also included. Write for your copy today.

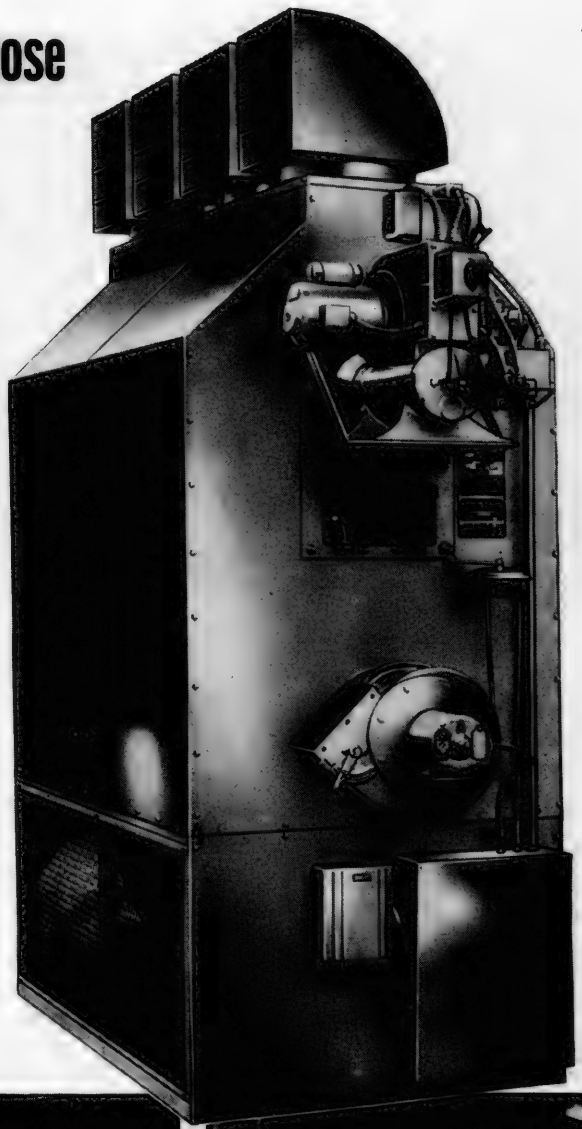
SPENCE ENGINEERING COMPANY, INC.
Walden, New York

SE 140

Specify LENNOX for those

BIG heating jobs!

FROM THE WORLD LEADER IN WARM AIR HEATING COMES THIS NEW FIELD-PROVED INDUSTRIAL HEATER . . . 400,000 to 2,000,000 Btu/h



Installation flexibility; that's the Lennox "AT" series industrial heater. No task too large or small—designed for space heating, make-up air, drying or oven application—with your option of floor, horizontal or inverted units. And you can use oil, gas or combination fuel. In every installation Lennox engineering produces *exceptional* efficiency. Here are just a few of the reasons:

- ***4-pass counter flow design*—gets more heat from the flame (no internal baffles).**
- ***Double casing with metal radiation shield*—provides insulating curtain of air to hold DOWN cabinet heat losses.**
- ***Stainless steel combustion chamber*—prevents failure due to unrelieved stress. Warranted for 10 years!**
- ***One master controller. . .*eliminates non-standard, hard-to-replace control system components.**

Send for complete engineering data and specifications; see for yourself why plant engineers the country over are specifying Lennox "AT" series heaters!

One of four Lennox gas-fired heaters at C. A. Roberts Company, Detroit mfr. of steel tubing. Mounted at ceiling height, this space saving 500,000 Btu/h heater is tailored to the job.

Two oil-fired Lennox heaters in Wheelock-Lovejoy's steel warehouse (Centerline, Mich.) provide warm air heating for 20,000 sq. ft. Units are 750,000 and 1,000,000 Btu/h capacity.

Five gas-fired Lennox heaters at Wm. Montgomery Co. warehouse, King of Prussia, Pa. Fresh air introduced by heaters replaces the truck-exhaust foul air.

LENNOX Industries Inc.

INDUSTRIAL DIVISION

1701 EAST EUCLID • DES MOINES, IOWA

- - - *Today*

LENNOX INDUSTRIES INC.
Industrial Division, Dept. A-6
1701 East Euclid, Des Moines, Ia.

Please send me—without obligation—complete specifications and engineering data on Lennox AT series Industrial Heaters.

Name_____

Company_____

Address_____ City_____

Title_____

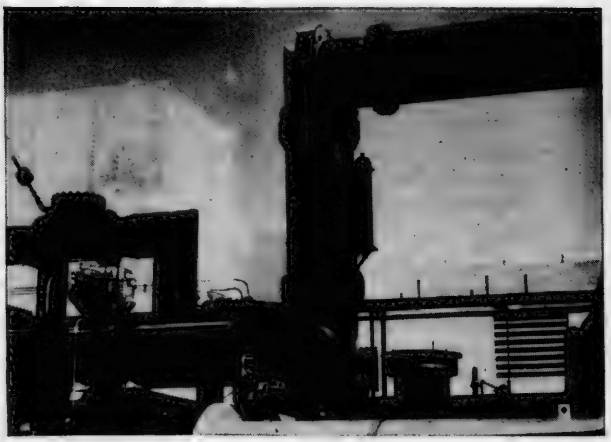
SPECIAL EXPANSION JOINTS

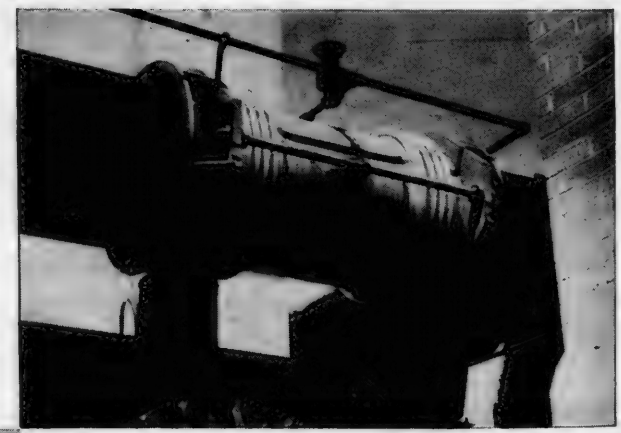
are Second Nature to ADSCO

These photographs show installations of special ADSCO Corruflex Expansion Joints at the Fairchild Engine Division, Fairchild Engine & Airplane Corp., Deer Park, Long Island, N. Y. All joints are designed to absorb lateral motion only, except that the long universal joint, right center, also absorbs any axial growth of its own. All joints are equipped with internal sleeves to smooth out the flow of high-temperature air being carried by the piping systems. They are not standard joints; they are specially engineered, specially manufactured.

A few years ago, when ADSCO was pioneering packless joints for special work, a job like this took considerable engineering and manufacturing time... because it was a new field. But since then, ADSCO has acquired so much experience from so many special orders that special jobs like the Fairchild one are truly "second nature".

Special applications of packless joints are developed carefully but not laboriously. Experience enables ADSCO engineers to get the work out easily and with confidence. Consult them next time you have a special piping problem.





REMEMBER!

Use ADSCO Expansion Joints instead of Pipe Bends because of these advantages.

1. LESS HEAT LOSS
2. LESS PRESSURE DROP
3. LESS SPACE
4. LESS COST

ADSCO DIVISION
20 MILBURN STREET
BUFFALO 12, NEW YORK

YUBA

YUBA CONSOLIDATED INDUSTRIES, INC.

get controlled distribution *to every circuit*

BUY SPORLAN REFRIGERANT DISTRIBUTORS *with the Famous* INTERCHANGEABLE NOZZLE!

the PEAK PERFORMANCE design with

Over 19 years of Leadership!

And in addition... get these plus features that only Sporlan Refrigerant Distributors can offer. The Interchangeable Nozzle permits easy capacity control either at the factory or on the job. Coil manufacturers can stock coils with distributors already attached and select proper nozzles upon order. Visual, air, or test wire inspection at coil and distributor connections are simplified by merely removing the nozzle. They permit final coil pressure leak test without damage to the valve.

So...Get Controlled Distribution to EVERY Circuit, whether you need 2 circuits or 2 dozen...1 distributor or a thousand. Buy Sporlan Refrigerant Distributors with the famous Interchangeable Nozzle for Peak Performance on all installations regardless of load or evaporator temperatures.

Better still...Install the famous Sporlan combination of Catch-All, See•All, Solenoid Valve and Thermostatic Expansion Valve along with it and get Peak Performance right down the line!

SPORLAN VALVE COMPANY

7525 SUSSEX AVENUE ST. LOUIS 17, MO.

EXPORT DEPT. AD. AURIEMA, INC. 85 BROAD STREET, NEW YORK 4, N.Y.

ANNOUNCING THE WEIL-McLAIN No. 82

OIL FIRED BOILER AND OIL HEATING UNIT

I=B=R tested and rated for capacities of 1300-3260 sq. ft. steam and 2255-5290 sq. ft. water

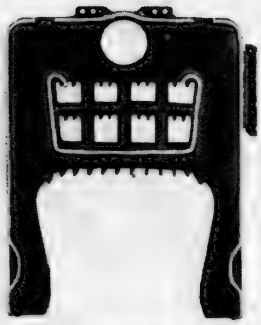
A genuine advance in boiler design...offering new features for operating economy, easy maintenance, simplified erection and long life!

The No. 82 Boiler incorporates the self-regulating, turn-around principle of flue gas travel developed by Weil-McLain engineers for increased heat transfer and greater fuel economy.

Other features include a new asbestos rope seal...a pre-cast refractory combustion chamber designed to properly develop the full heat potential of the burner flame...an electronic safety control to prove the flame in No. 82 Boilers burning 7 GPH and up...top clean-out plates for easy access to all surfaces...and short draw rods which simplify erection and assure a strain-free boiler assembly.

PROVISION FOR SINGLE OR DUAL WATER HEATERS

The Weil-McLain No. 82 Boiler has a unique and exclusive method of installing tankless water heaters. The diagram below shows how either single or dual heaters can be employed. The fin tube heater itself is a highly efficient unit of large capacity.



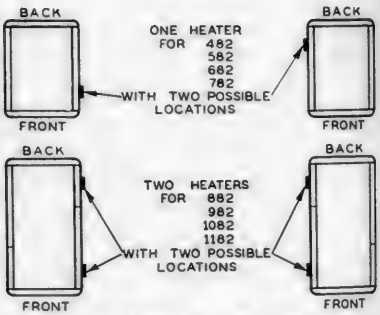
ASBESTOS ROPE SEAL

Exclusive! Asbestos rope inserts in grooved seal strip in boiler sections. Compressible—won't crack or squeeze out ...remains gas-tight during life of the boiler.

SELF-REGULATING FLUE GAS TRAVEL

Ingenious design of sections breaks flue gases into multiple streams which contact all heating surfaces to top of sections...greatly increases heat transfer.

TANKLESS WATER HEATER



IF ONLY ONE HEATER IS TO BE USED ON 882 THRU 1182 ANY ONE OF THE FOUR POSITIONS INDICATED ABOVE MAY BE USED.

Send for bulletin giving complete description and engineering data

WEIL-McLAIN BOILERS RADIATORS

WEIL-McLAIN COMPANY

MICHIGAN CITY, INDIANA

Address literature requests to Dept. BB-68

Luxury MOTEL solves noise problem by changing to

B&G UNIVERSAL PUMPS

The seven-acre, landscaped patio of HiwayHouse includes a swimming pool, children's playground, golf putting area and a miniature railroad. Year 'round air conditioning is provided by a central circulated water system.

MECHANICAL CONTRACTOR:
Arizona York Refrigeration Co., Phoenix, Arizona

HIGHLIGHTS OF B&G UNIVERSAL PUMP DESIGN

● Non-overloading motor—constructed, selected and stamped for *extra quiet* operation ● Sleeve bearings, oil lubricated, in both pump and motor ● Motors ring-type mounted, suspended in rubber ● Spring-type quiet coupler ● Oversized special alloy steel shaft with integral collar which absorbs thrust ● Removable bearing frame—no need to break pipe connections or remove motor ● "Remite" Mechanical Seal, diamond hard, prevents water leakage ● Hydraulically balanced impeller

Reg. U.S. Pat. Off.

HiwayHouse, fabulous 250-room motor hotel at Phoenix, Arizona, was planned and built by Del E. Webb Construction Co. with the comfort and convenience of guests as the only consideration. Among its features is a circulated water heating and cooling system, which required corrective measures because of noise.

The mechanical contractor describes the cause and the remedy as follows:

"A conventional type of pump was originally used in the air conditioning system. When the system was turned on, a motor hum and water noise was transmitted through the units in the motel rooms. The room units with their copper coils and radiator fins acted as sounding boards, particularly at night when fans were off.

"To correct this problem we replaced the conventional pumps with Bell & Gossett Universal Pumps properly sized for the job. This completely eliminated transmission of noise and there is now 100% quiet operation in all rooms of the motel.

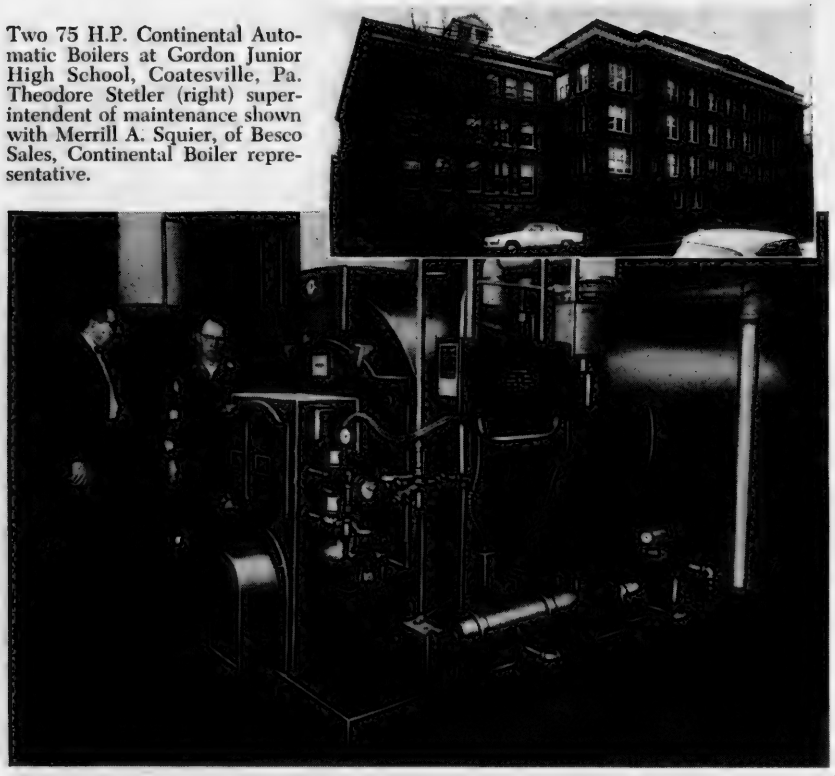
"In general, it has been our experience that B&G Universal Pumps for this type of operation are far superior to any other type of pump and we recommend them highly."

BELL & GOSSETT
COMPANY

Dept. FH-4, Morton Grove, Illinois

Canadian Licensee: S. A. Armstrong Ltd., 1400 O'Connor Drive, Toronto 16, Ontario

Two 75 H.P. Continental Automatic Boilers at Gordon Junior High School, Coatesville, Pa. Theodore Stetler (right) superintendent of maintenance shown with Merrill A. Squier, of Besco Sales, Continental Boiler representative.



HEATING COSTS CUT 21% with new Continental Boilers

In 1955, the Coatesville, Pa. school district purchased two new 75 H.P. Continental Automatic Boilers firing #5 oil to heat three adjoining school buildings from a central plant. The new boilers saved $2,614.51 in the first two years of operation. This is a 21% reduction in heating costs.

Merrill A. Squier, of Besco Sales, Continental Boiler representative in the Philadelphia area, says:

"You can count on Continental for highly efficient, low cost steam or hot water. Because of the simplified design, maintenance and downtime are cut to the bone. There are no refractory baffles to burn out, leak and cause short circuit of gases. Free rapid water circulation keeps heating surfaces clean. Steam and water spaces are easily checked through openings. Clean-out is easy."

Continental Boilers, firing oil or gas, are available in models from 20 to 600 H.P. with on/off, low-high-low, or modulating controls. For steam heating or process work at pressures from 15 to 250 lbs., or hot water heating at low or high temperatures. Literature on request.

BOILER ENGINEERING & SUPPLY COMPANY, INC.
Phoenixville, Penna.

The Continental AUTOMATIC BOILER

A HALF CENTURY OF BOILER MANUFACTURING EXPERIENCE

Let your Continental Automatic Boiler Specialist Help You

CALIFORNIA
El Cerrito—American Engineering & Mfg. Corp.
Palm Springs—Pacific Engineering Equip. Co.

COLORADO
Englewood—Champion Specialty Co.

DISTRICT OF COLUMBIA
Washington—Charles C. Plummer

FLORIDA
Jacksonville—H. L. McMurry & Co.
Miami—H. L. McMurry & Co.
Orlando—H. L. McMurry & Co.
Tampa—H. L. McMurry & Co.

GEORGIA
Atlanta—Mechanical Associates
Augusta—Tarte Boiler Repair Co.

ILLINOIS
Chicago—Automatic Steam Sales Co.

INDIANA
Indianapolis—Plibrico Sales & Service Co.
New Albany—Falls Cities Boiler & Machine

LOUISIANA
New Orleans—Cressy Sales Company

MARYLAND
Baltimore—Heating Services, Inc.

MASSACHUSETTS
Dorchester—Lewis National Corp.

MICHIGAN
Dearborn—Kramer & Associates, Inc.

MINNESOTA
Minneapolis—Oil Burner Service Co., Inc.
St. Paul—Lincoln Equipment Company

MISSISSIPPI
Jackson—Climate Engineers, Inc.

MISSOURI
St. Louis—Continental Boiler & Sheet Iron Works

NEBRASKA
Omaha—Midwest Utility Service Co., Inc.

NEW YORK
Buffalo—W. J. Clark Equipment Co.
Gloversville—Olin T. Caldwell & Co.
Hudson Falls—Boiler Equipment Co.
New York—Thermal International, Inc.
Rochester—Ernest J. Rookey
Syracuse—U & S Supply Corp.

NORTH CAROLINA
Greensboro—M. G. Newell Co., Inc.

OHIO
Cincinnati—Kenneth B. Little Co.
Cleveland—P. M. Equipment Co.
Toledo—Air Conditioning Distributors, Inc.

OKLAHOMA
Oklahoma City—Mecha-Line Co.

PENNSYLVANIA
Phoenixville—Besco Sales, Merrill A. Squier
Pittsburgh—John C. Gregg Company

RHODE ISLAND
Providence—Weatherall Engineers, Inc.

TENNESSEE
Knoxville—Boiler Supply Co.
Memphis—Middle States Associates, Inc.
Nashville—Boiler Supply Company

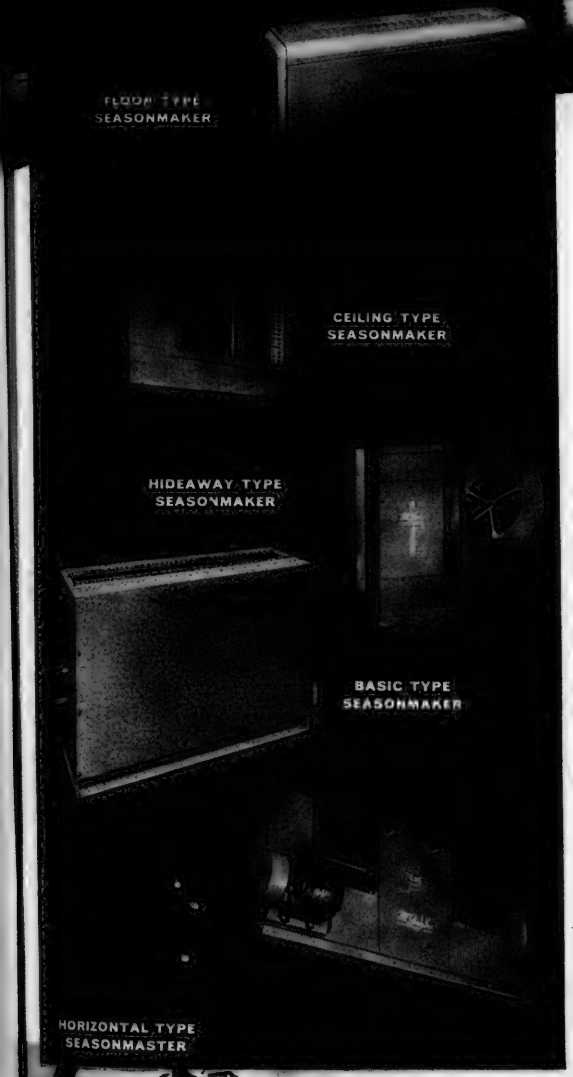
TEXAS
Dallas—Rodgers Engineering Co., Inc.
Fort Worth—J. P. Philibert

UTAH
Salt Lake City—Power Engineering Company

VIRGINIA
Suffolk—C. Fred Bailey

WISCONSIN
Milwaukee—Industrial Steam, Inc.

The Sands Hotel, Tucson, Arizona
Architects: Hausner & Macsai, Chicago, Ill.
General Contractor: Murray J. Shift Construction Co., Tucson, Arizona
Mechanical Contractor: Aire Engineering Co., Tucson, Arizona.



McQuay

SEASONMAKER • SEASONMASTER

Air Conditioning Units

To those who winter in Arizona as well as those who spend all of their time in this picturesque vacationland, the Sands Hotel is famous. And here are 131 more reasons why. The Sands is completely air conditioned by 129 McQuay Seasonmaker individual room units and two McQuay Seasonmaster Central Type units for the larger areas, which provide both heating or cooling as the weather demands. For the greatest flexibility, for the greatest possible efficiency and economy, investigate McQuay. Call in your McQuay representative and have him show you why you can always depend upon McQuay proven products. McQuay, Inc., 1619 Broadway St. N. E., Minneapolis 13, Minnesota.

[redacted] Means Quality

FLOOR TYPE SEASONMAKER—for free standing floor mounting. Four sizes, 200 cfm to 600 cfm, ½ to 2 ton nominal cooling capacity. Both thermally and acoustically insulated. Choice of three air discharge grilles.

CEILING TYPE SEASONMAKER—for suspended mounting. Seven sizes, 200 cfm to 2000 cfm, ½ to 5 ton nominal cooling capacity. Both thermally and acoustically insulated.

HIDEAWAY TYPE SEASONMAKER—for concealed, suspended mounting in closets, attics or furred spaces. 7 sizes, 200 cfm to 2000 cfm, ½ to 5 ton nominal cooling capacity. Insulated drain pan.

BASIC TYPE SEASONMAKER—for fully recessed built-in wall installations. Four sizes, 200 cfm to 600 cfm, ½ to 2 ton nominal cooling capacity. Thermally and acoustically insulated.

HORIZONTAL SEASONMASTER—for central station air conditioning, available with cooling coil, heating coil, bypass, mixing box and filter section. Removable panels permit inspection or service. Seasonmaster coils are made with exclusive McQuay Ripple-Fin construction.

McQuay INC.

AIR CONDITIONING
HEATING
REFRIGERATION

17 YEARS

TRADE FRICK MARK®

"ECLIPSE" COMPRESSORS AIR CONDITION TVA OFFICES

TVA OFFICES AT KNOXVILLE, TENN.

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE

Frick Company
Waynesboro
Pennsylvania

Gentlemen:

We have a Frick central air-conditioning system in our Old Post Office Building which was installed by your engineers in 1940. It consists of four compressors and two evaporative condensers.

As this equipment has been in continuous use throughout each year for seventeen years, we feel that it is time for a thorough check, and repairing or replacing of necessary parts.

To get a complete and competent check, and proper recommendations, we would like to have one of your staff engineers or field representatives examine our equipment and advise on necessary corrections; also to furnish any cost estimates.

If any of your factory personnel is planning on being in this area in the near future, we would appreciate their stopping here and making the inspection. In the event they do, would you advise us as to the date.

Very truly yours,

A. L. Boyd

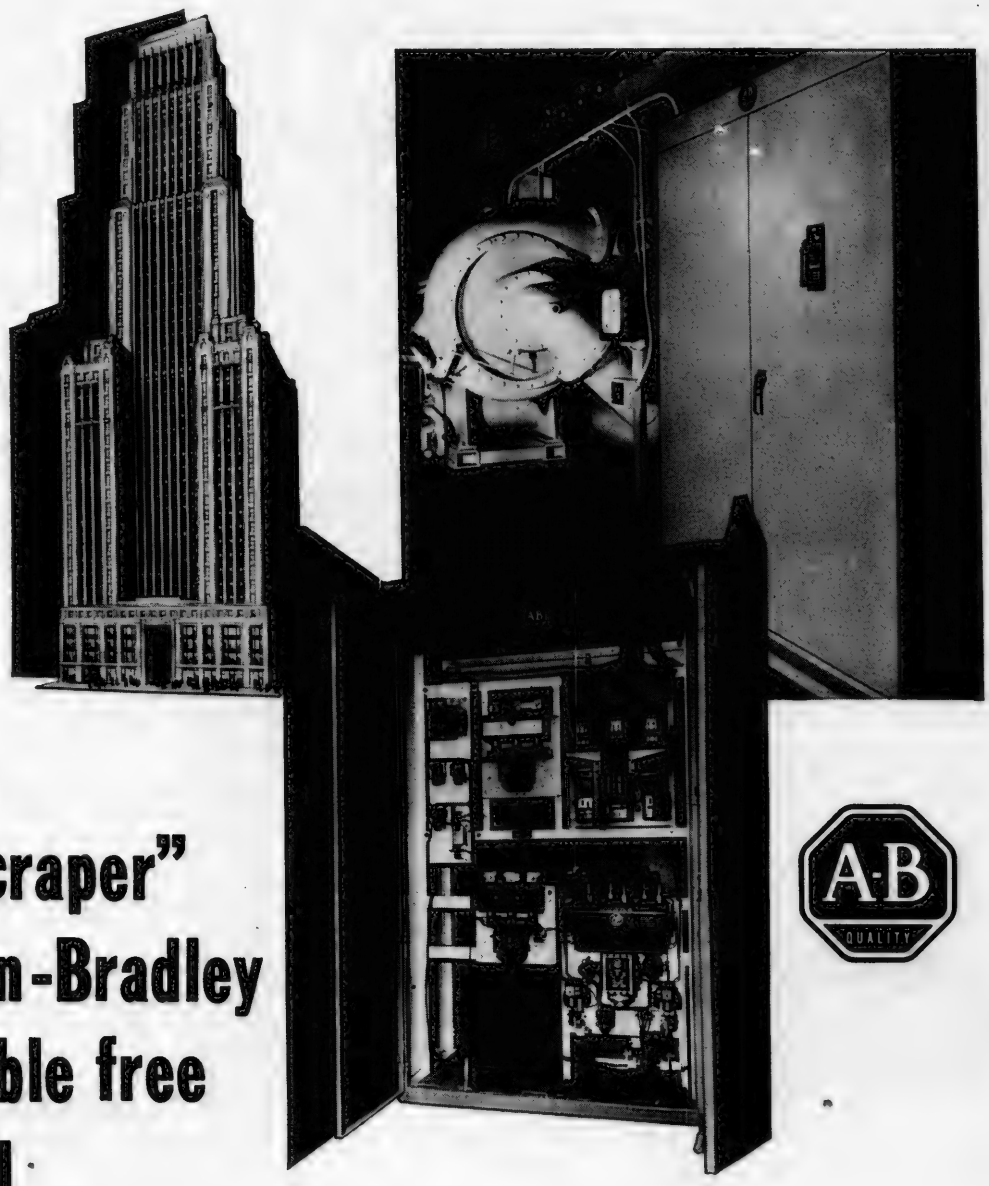
A. L. Boyd
Eastern District Manager
Office Service Branch

Frick equipment is world renowned for being better-built, more economical, and giving a lifetime of dependable service.

What are your COOLING needs? If you want cool air, cold water, ice, extremely low temperatures, or refrigeration for quick freezing and processing—in any commercial or industrial sizes—call in a Frick representative at the planning stage for recommendations and estimates. They have the specialized knowledge and equipment to solve your cooling problems.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA., U. S. A.

One North La Salle Building, Chicago. This 48-story office building is being completely air conditioned.



another "skyscraper" uses Allen-Bradley trouble free control

A-B QUALITY

It's no "accident" that Allen-Bradley motor controls are selected for so many of the larger air conditioning installations . . . it's because of their *recognized* reputation for long, trouble free life.

The simple solenoid design—which *only* Allen-Bradley offers in *all* sizes up through Size 7—has only ONE moving part. There are no bearings to corrode and stick . . . no flexible jumpers to wear and break. Also, the double break, silver alloy contacts—standard *throughout* the Allen-Bradley line—never need service attention. You can install Allen-Bradley control . . . and forget it.

Be sure to specify Allen-Bradley . . . the *quality* motor control . . . for your air conditioning system. You will never regret this decision. Send for your copy of the latest A-B Catalog, today.

Consulting Engineers: Brooke & Chaporis.
Air Conditioning Contractors: Gallaher & Speck.
Electrical Contractors: Goldberg & O'Brien Electric Co.
Managing Agent: L. J. Sheridan and Co.

Above: The first of three 500-ton Trane units with its Allen-Bradley Bulletin 1277 reduced voltage autotransformer starter. Below: Open view of the Bulletin 1277. This starter has closed circuit transition, and meets power company requirements for acceleration without heavy current surges.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

Allen-Bradley Co., 1330 S. Second St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

NEW! AAF model B

GALVANIZED METAL MINIMIZES CORROSION!
NEW FOOL-PROOF OPERATION – SIMPLIFIED MEDIA FEED!
REINFORCED MEDIA! IMPROVED ADHESIVE!
GREATER CFM PER UNIT! MORE FILTERING AREA!
NEW MEDIA SUPPORTS ADD STRUCTURAL STRENGTH TO FRAME!
LESS MAINTENANCE TIME REQUIRED!
NOW ONE DRIVE WILL SERVE SIX UNITS!

Roll-O-MATIC® AIR FILTER!

RETAINS *ALL* THE FEATURES of the amazing AAF Roll-O-Matic that have led to installation of thousands of sections at 2,100 locations since 1954—totalling more than 100 million cfm!

- Clean air by the roll!
- As simple to service as a roll-fill camera!
- Infrequent maintenance!
- No oil or water for washing!
- High cleaning efficiency!
- Large dust-holding capacity!
- Fully automatic!
- Simple disposal of used media!
- Notifies operator when needing attention!
- Low power requirements!

and offers *these* big IMPROVEMENTS

✓ **Stronger MEDIA!** Unique Roll-O-Matic filtering media is now reinforced for greater strength. New adhesive (1) won't "run" in high temperatures, (2) won't thicken in low temperatures, and (3) won't lose adhesive qualities due to dryness.

✓ **Simpler OPERATION!** Positive drive for introducing new media and re-winding used media. Minimum of moving parts.

✓ **Easier MAINTENANCE!** Non-corrosive frame, simpler operation, stronger media, better adhesive, re-location of drive all add up to fewer maintenance headaches.

✓ **Greater CFM!** Now, more media area, more CFM per filter! New design provides maximum effective filtering area per unit.

✓ **Rugged, heavy-duty DRIVE!** Drive is now on service side of unit for easier accessibility. Fractional hp. drive will serve six units of maximum standard height and width. Means big savings in first cost, installation, and operation.

✓ **Corrosion-resistant CONSTRUCTION!** The Model B Roll-O-Matic is constructed of galvanized metal . . . minimizes corrosion problem. New media supports add to structural strength of frame in addition to serving as media guides.

WRITE TODAY FOR NEW ROLL-O-MATIC BULLETIN 248-C!

AAF herman nelson

American Air Filter
COMPANY, INC.

294 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

AAF Filters and Precipitators

Herman Nelson Propeller Fans

—— BETTER AIR IS OUR BUSINESS ——

Illinois Heating Specialties

AAF DUST Control Equipment

THERMAL...
For Heating and Ventilating

Raytheon Manufacturing Company, a leading maker of electronic components and systems, employs Thermal Engineering units for heating and ventilating its new, modern plant*, located in the Waltham Industrial Center, Waltham, Mass.

This is just one of many outstanding buildings throughout the country using Thermal equipment, because this equipment can be specified with confidence that it will deliver years of satisfaction. Thermal Engineering manufactures a complete line of central plant and multizone conditioners, sprayed coil units, heating and ventilating units, heating and cooling coils and air-cooled condensers. Your copy of the Thermal Catalog is ready, write for it today.

*Engineers: Cabot, Cabot & Forbes Engineering Division, Boston, Mass.
General Contractor: Aberthaw Construction Co., Boston, Mass.
Heating Contractor: Crane Plumbing & Heating Co., Cambridge, Mass.

Agents in principal cities.

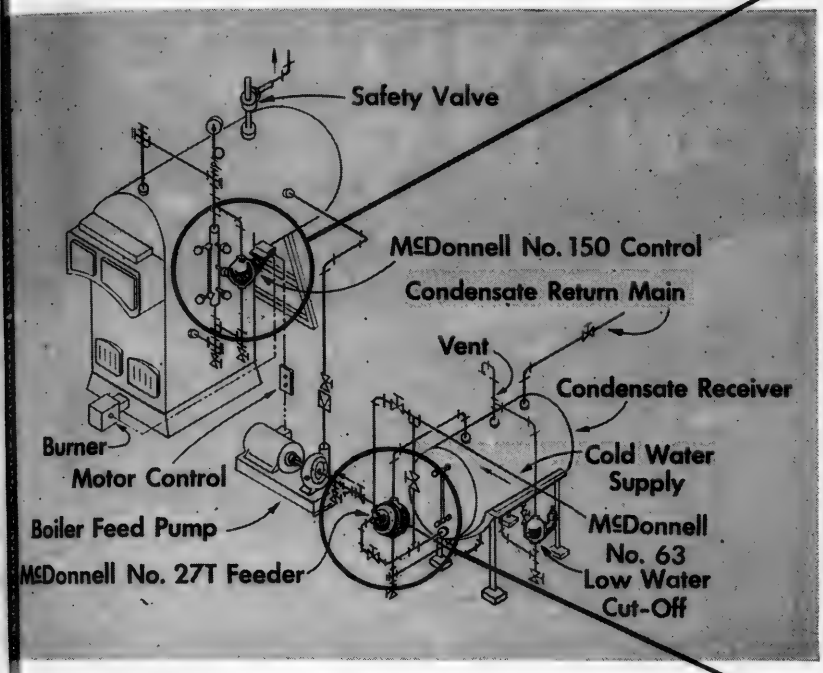
Quality Products Since 1945

THERMAL ENGINEERING CORPORATION

2605 W. DALLAS • P. O. BOX 13254
HOUSTON 19, TEXAS

End the WATER LEVEL WORR

In those medium pressure boilers

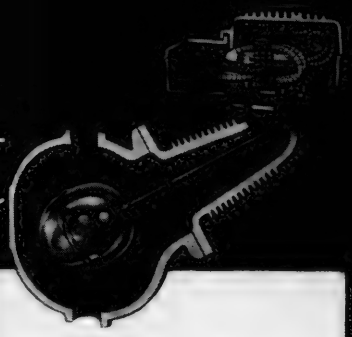


Here's the great combination that takes all the worries and troubles out of water level and feed pump control for the many medium pressure boilers — boilers with steam pressures up to 150 psi.

The drawing above shows the simple hook-up. McDonnell No. 150 controls the boiler feed as it should be controlled — directly from the boiler water level. This holds the water level within the close limits that assure maximum steaming efficiency and fuel economy. Any deficiency in the returns is at once replaced by the McDonnell No. 27T Make-up Water Feeder installed on the receiver.

An extra switch on the No. 150 provides circuits for cutting off burner and sounding low water alarm — a final safeguard from emergency conditions such as current interruption in the pump circuit or failure of make-up supply.

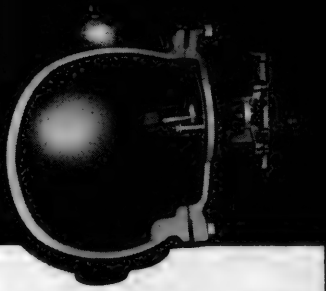
Yes, this is the hook-up that gives you close control of the water level and maximum protection from low water in the broad group of medium pressure plants. Ask for simple installation and wiring diagrams covering every condition.



McDONNELL No. 150
PUMP CONTROL

No. 150 can be used as a pump control, low water fuel cut-off and low water alarm. It has two mercury switches (Underwriters' listed); one for starting and stopping feed pump; the other for low water cut-off of burner and sounding low-water alarm bell if desired.

It has proved its ability in thousands of plants to stand up under the pressures and temperatures encountered in boilers of any size or type with maximum steam pressure, 150 psi. Packless construction is provided by extra heavy monel sylphon — no stuffing boxes to cause trouble. Switch leads have heat-impervious porcelain-bead insulation. Mechanism is sealed from tampering. Other types for higher pressure boilers.



McDONNELL No. 27T
MAKE-UP FEEDER

No. 27T is a float-operated make-up water feeder particularly well qualified for the tough job of maintaining the required water level in receiving tanks.

Large water feeding capacity when water is required, permits the location of the No. 27T at a relatively low point on the receiving tank. This provides adequate space for return condensate, preventing wasteful overflow. Sturdy construction enables it to withstand turbulent conditions so often present in receivers. It is built for tank pressures up to 35 lbs.; water supply pressures to 100 lbs.* Other McDonnell Make-up Feeders, including flange-mounted types are available for practically all needs.

*A further precaution is the McDonnell No. 63 Low Water Cut-off which prevents pump operation in case water supply is interrupted.

DONNELL & MILLER, Inc., 3500 N. Spaulding Ave., Chicago 18, Ill.

Doing One Thing Well

Your Jobber Stocks Th

McDONNELL

Boiler Water Level Controls

ER WATER FEEDERS • LOW WATER FUEL CUT-OFFS • PUMP CONTROLLERS • RELIEF VALVES • FLOW -RELATED LIQUID LEVEL CONTROLS FOR TANKS, STILLS, AIR CONDITIONING SYSTEMS

KRAMER

UNICON for UNLIMITED TONNAGE

Kramer Unicon has brought a new era into the industry. With more than 20 years of unique practical experience and know-how in dry condensing, Kramer again offers new avenues of opportunity to the air conditioning and refrigeration industry.

Unicon now has no capacity limit. Standard Unicon systems up to 540 tons are now cataloged for the first time.

Unicons for heat pump applications are now also available with no horsepower limitations.

Kramer engineering and design has proven that the Unicon can move large volumes of air with extreme quietness.

Unicon has long proven by actual experience that it is free from fouling or corrosion and requires practically no maintenance.

The total operating weight per ton for Unicon is very low, resulting in minimum platform and reinforcement requirements.

Unicon space requirements are surprisingly small; a 300 ton system requires only 15' x 14' floor space and is 12' high.

WRITE FOR BULLETIN U-391

KRAMER TRENTON CO. • Trenton 5, N.J.

44 YEARS OF CONTINUOUS ACHIEVEMENT IN HEAT TRANSFER

HOFFMAN TRAPS

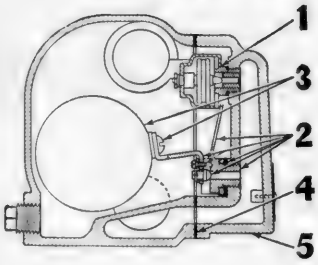
GUARD AGAINST STEAM WASTE

Hoffman Traps provide improved design to *function more effectively and economically in removing condensate* from steam lines and equipment.

Hoffman engineers have anticipated steam requirements that demand less maintenance time and operating costs. Typical of Hoffman's complete line are the Traps illustrated, each with removable cover, pin and seat for quick inspection and cleaning.

50 SERIES F & T TRAP

***Featuring* LOW MAINTENANCE COST**

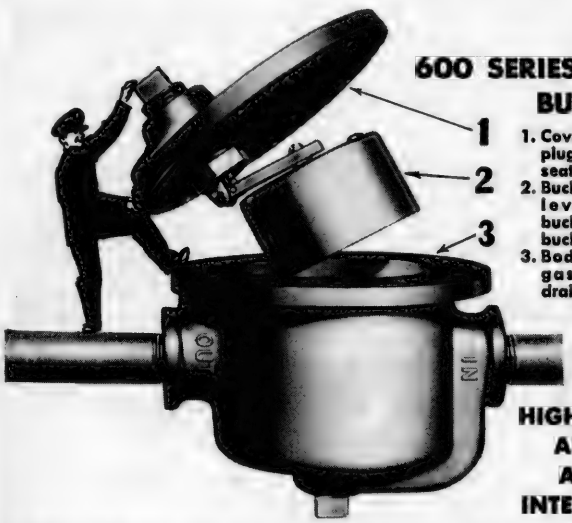


Float and Thermostatic Traps are so designed that all working parts of the trap are a part of the removable cover. Once installed there is no necessity for the breaking of any pipe connection for cleaning and repairing.

1. Compact Thermostat Assembly
2. Durable, accurately machined Valve Lever and Seat Assembly
3. Copper Float Ball Assembly
4. Graphite Impregnated Asbestos Gasket
5. Heavy Duty Cast Iron Cover

LOW, MEDIUM & HIGH PRESSURE THERMOSTATIC TRAPS

600 SERIES INVERTED BUCKET TRAP



1. Cover assembly with plug, valve seat, valve seat holder.
2. Bucket assembly with lever, valve stem, bucket pin, lock nut and bucket.
3. Body assembly with gasket and bottom drain plug.

HIGHLY EFFICIENT AND EASILY ACCESSIBLE INTERIOR DESIGN

Hoffman Bucket Traps operate intermittently and are ideal for draining condensate and air from steam lines or equipment where large quantities of air and condensate must be discharged. They are easily inspected, cleaned and serviced by merely removing the cover assembly.

RENEWABLE THERMOSTATS and VALVE SEATS

A complete line of Low, Medium and High Pressure Thermostatic Traps for service with radiation, dryers, sterilizers, mangles, cookers and similar uses. Renewable thermostats and seats are important constructional features contributing to long life, low cost service. Medium and High Pressure Traps have stainless steel pins and renewable seats.

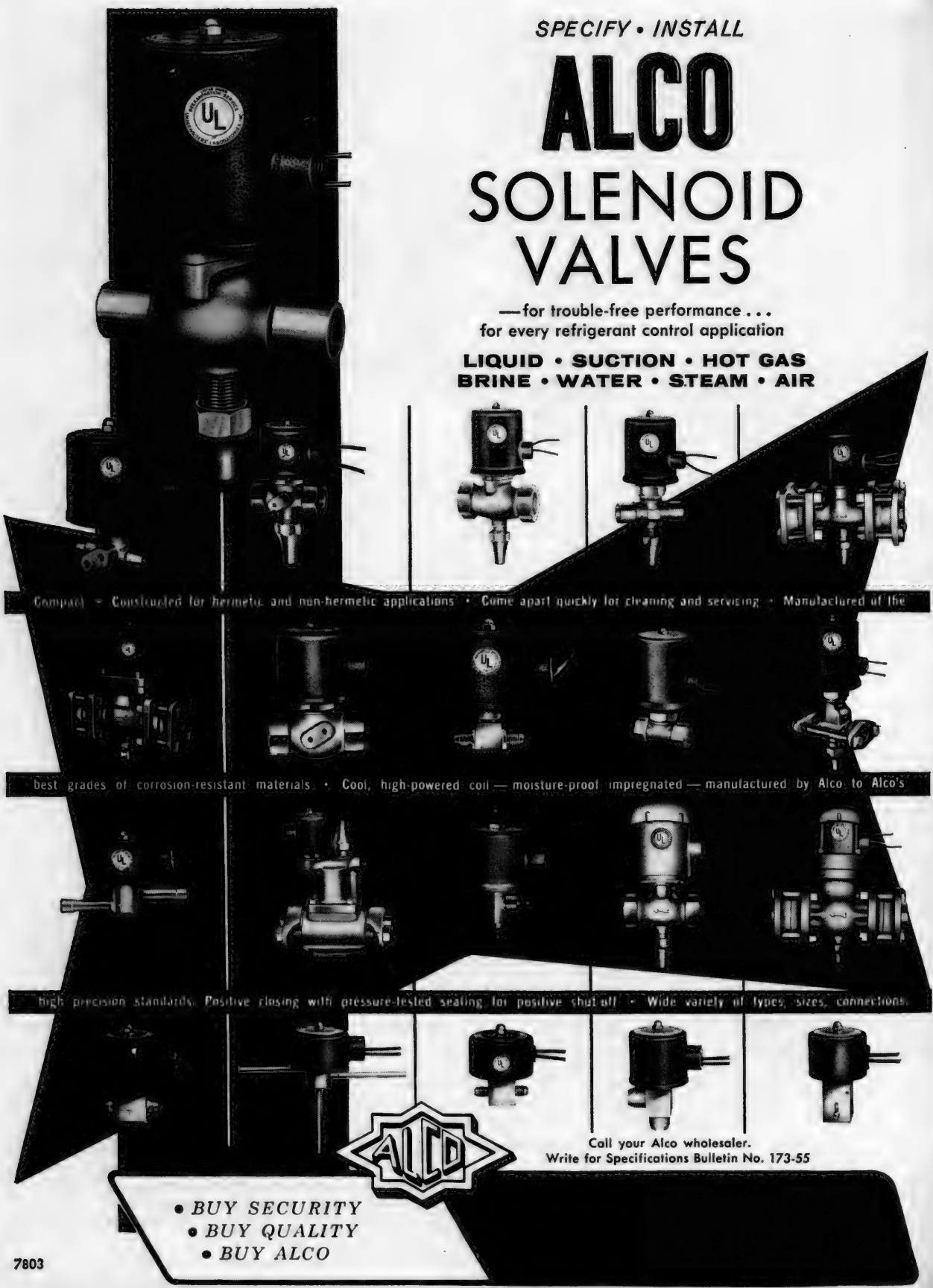
For full particulars, write for catalogs on Bucket Traps, Float and Thermostatic Traps or Thermostatic Traps

SPECIFY • INSTALL

ALCO SOLENOID VALVES

—for trouble-free performance . . .
for every refrigerant control application

LIQUID • SUCTION • HOT GAS
BRINE • WATER • STEAM • AIR



Compact • Constructed for hermetic and non-hermetic applications • Come apart quickly for cleaning and servicing • Manufactured of the best grades of corrosion-resistant materials • Cool, high-powered coil — moisture-proof impregnated — manufactured by Alco to Alco's high precision standards. Positive closing with pressure-tested sealing for positive shut-off • Wide variety of types, sizes, connections.

Call your Alco wholesaler.
Write for Specifications Bulletin No. 173-55

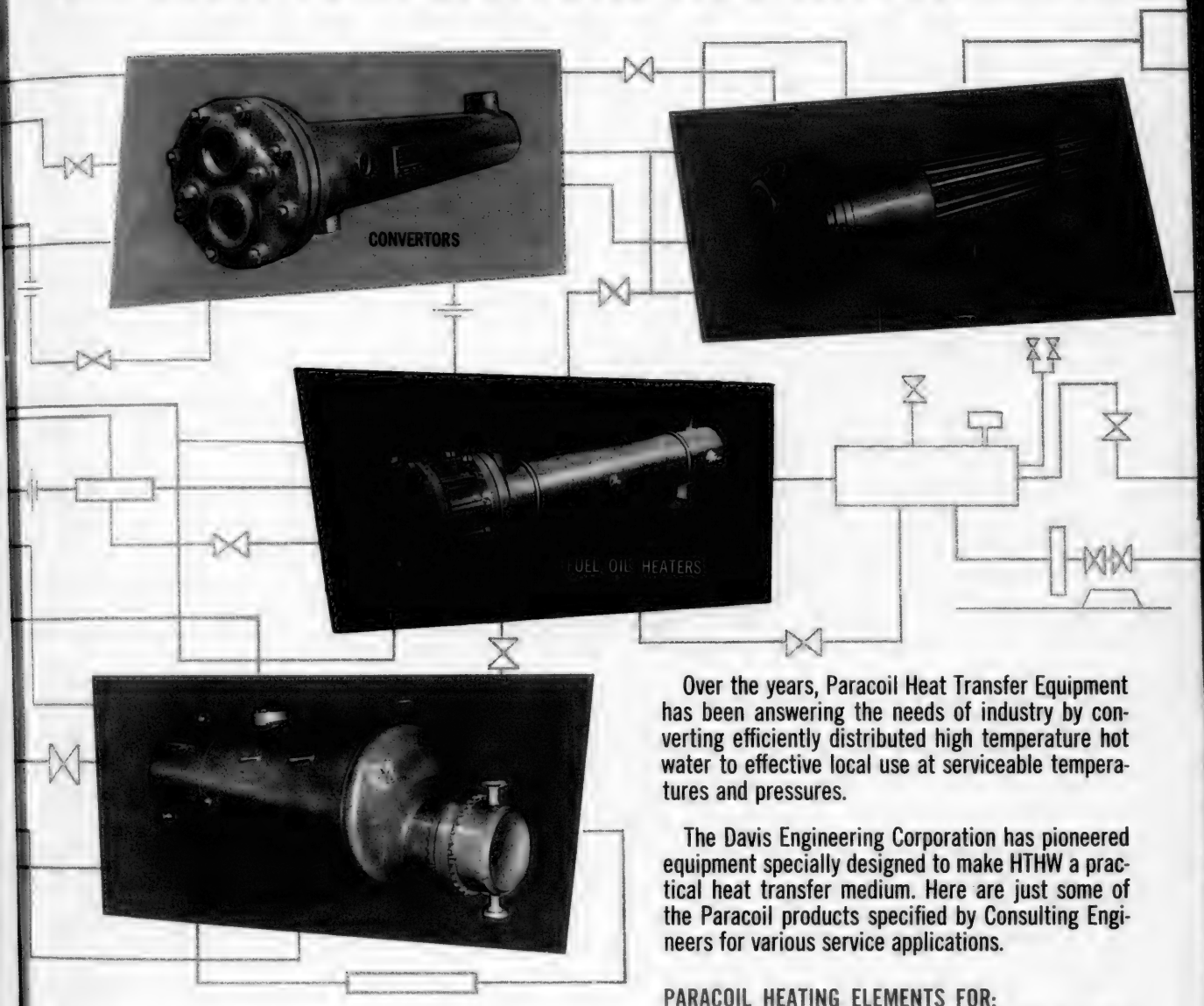
• *BUY SECURITY*
• *BUY QUALITY*
• *BUY ALCO*

7803

The one complete line of refrigerant controls: Thermostatic Expansion Valves • Refrigerant Distributors Solenoid Valves • Suction Line Regulators • Flooded Evaporator Controls and Reversing Valves

Paracoil Heat Transfer Equipment

puts HIGH TEMPERATURE HOT WATER to work



Over the years, Paracoil Heat Transfer Equipment has been answering the needs of industry by converting efficiently distributed high temperature hot water to effective local use at serviceable temperatures and pressures.

The Davis Engineering Corporation has pioneered equipment specially designed to make HTHW a practical heat transfer medium. Here are just some of the Paracoil products specified by Consulting Engineers for various service applications.

PARACOIL CONVERTORS FOR:

Space Heating — radiators, radiant heating panels, etc.

Process Heating — vulcanizers, kettles, plastic rolls and platens.

Miscellaneous Heating — snow melting systems, domestic water in storage tanks, electroplating tanks, roof tank heating coils, and wherever hot water is the heating medium.

PARACOIL HEATING ELEMENTS FOR:

Hot Water Storage Tanks — installed in office buildings, laundries, schools, gymnasiums, factories, hospitals, etc.

PARACOIL STEAM EVAPORATORS FOR:

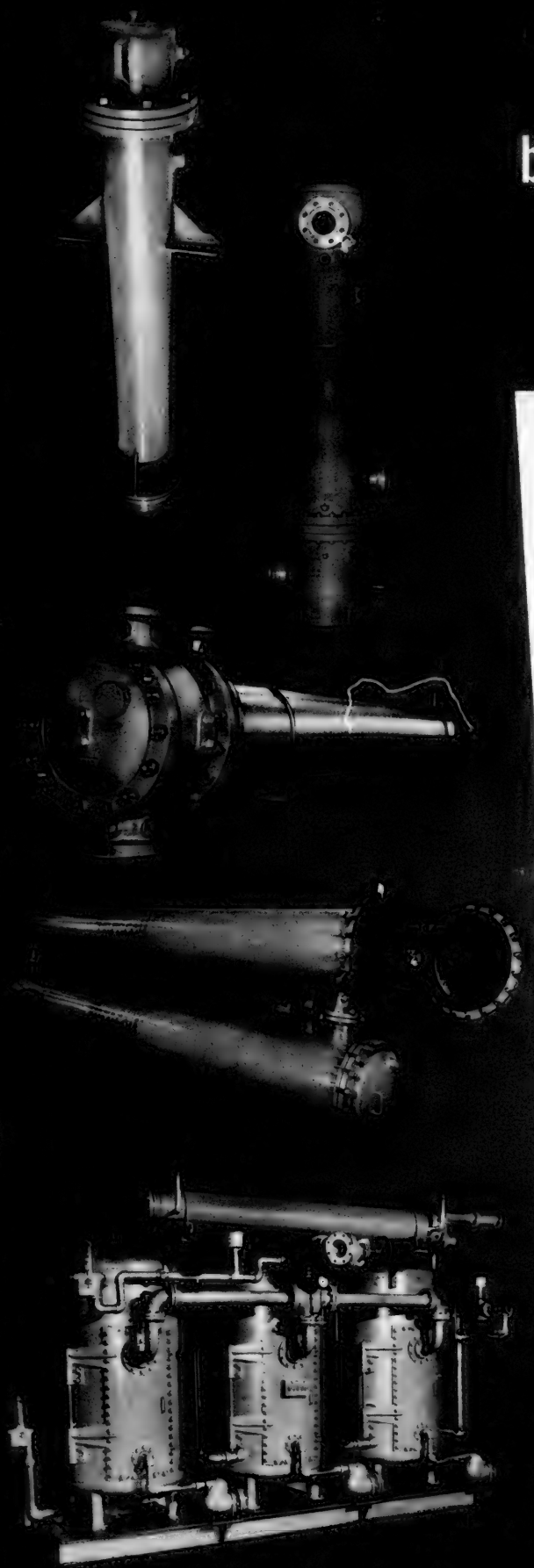
spot process application, cooking equipment, sterilizers, calender rolls, etc.

PARACOIL FUEL OIL PREHEATING SYSTEMS:

designed to eliminate contamination through isolation of HTHW from the fuel oil.

DAVIS ENGINEERING CORPORATION

30 Ro[illegible] f[illegible] Pl[illegible] N[illegible] Y[illegible] 20 N[illegible] Y[illegible] Cl[illegible] 5[illegible]



builds a complete line

air heaters and coolers

blowdown exchangers

brine heaters and coolers

boiler coils

chemical process equipment

condensers
freon, reflux, steam, solvent, vent

converters
steam-to-water
water-to-steam

coolers, refrigeration
brine, freon

coolers, industrial
condensate, jacket water
lube oil, quenching oil
boiler-water sample, drain

distilling plants
fresh water; salt water

economizers

evaporators
freon, water distilling, boiler-feed water make-up, contaminated water, fresh-water, salt-water

extractors
grease, boiler feedwater

filters
aerating, distilled water, charcoal, feedwater

flexible nipples

float feed controls

fuel oil heaters
indirect gas-fired Type "GF"
THERMO-FILM safety type
self-cleaning type
straight tube type
suction bell
tank suction type
tubular type
U-tube type

gas heaters and coolers

heating elements

heat reclaimers
open & closed types, laundry

heaters, domestic water
indirect and tankless

heaters, exhaust gas

heaters, feedwater
coil type, standard and improved
straight and U-tube types

heaters, storage tank

heaters, general
acid, alcohol, alkali, water, solvent, process, etc.

instantaneous water heaters

inspection tanks

jacket water coolers

lube oil heaters and coolers

pilot plant equipment

preheaters and reclaimers
for reclamation of heat from hot spent liquids

propane vaporizers

reboilers

refrigeration exchangers
condensers, coolers, evaporators, receivers

stills
for distillation of sea, river, lake or spring water

traps, steam

valves
cross & 3-way high pressure
exhaust gas by-pass
three-way swing type

vent condensers

waste-heat exchangers

white-water heaters

DAVIS ENGINEERING CORPORATION

Every engineer should know

How CHRYSLER'S AIRTEMP controls

The 3 "Secret Costs" of Air Conditioning

You can't measure the real cost of air conditioning by the price tag on the equipment

Real cost depends on long-term savings versus long-term expenses

Specify Airtemp today, and ten years from now your client will still be grateful for your good judgment. It's the finest air conditioning he can buy. Yet it's also the least expensive. Year after year, Airtemp will cut your client's expenses by reducing the 3 "secret costs" of air conditioning to a minimum.

THE SECRET COST OF WRONG EQUIPMENT
The wrong equipment can be troublesome as well as costly to operate. Airtemp makes all kinds of air conditioners—over 297 models—and can advise you on which is best for your client's needs. You're sure to get exactly the right equipment from Airtemp!

THE SECRET COST OF OPERATION
Operating costs over a few years may actually exceed the first cost of air conditioning. But rock-bottom operating costs can save substantial sums. That's why you should know that AIRTEMP—thanks to Chrysler engineering—promises the lowest operating costs in the industry!

THE SECRET COST OF MAINTENANCE
Maintenance costs and repair costs can be a shock. A breakdown brings repair bills PLUS the cost of lost time, lost business. But Airtemp air conditioning is carefully engineered by Chrysler for trouble-proof operation. And Airtemp is installed only by qualified contractors, who must certify to Airtemp that equipment warranted for 5 years has been installed properly. That's why Airtemp maintenance costs average out to be the lowest in the industry!

May we give you the complete facts? For prompt action mail the coupon below. Or phone your nearest Airtemp contractor or dealer who is listed in the Yellow Pages.

CHRYSLER

Airtemp

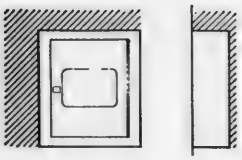
AIRTEMP DIVISION, CHRYSLER CORP.
Dept. AC-6-58, Dayton 1, Ohio
We would like the full facts on how Airtemp controls the 3 "secret costs" of air conditioning.

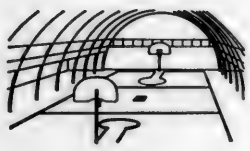
Name_____
Address_____
City_____ Zone____ State_____
Firm Name_____

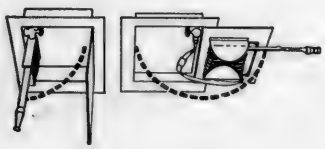
"Greatest improvement in Standpipe Fire Protection in 50 years!"

New... ALLENCO HOZEGARD CABINETS

UL Listed







- **Save Space**—35% less area, less depth; not limited to walls, may be installed on any plane, even floors*
- **Cut Cost**—save 25%-30% on each unit installed, by eliminating costly pin-type rack and time of loading hose on it
- **Serve Best**—foulproof door-rack swings full 180 laterally *or* vertically; hose "points" faster, reaches further
- **UL Listed**—thoroughly tested; *first* complete fire hose cabinet unit, including equipment, to be 100% Underwriters Listed

**using appropriate framing and solid (no glass) door*

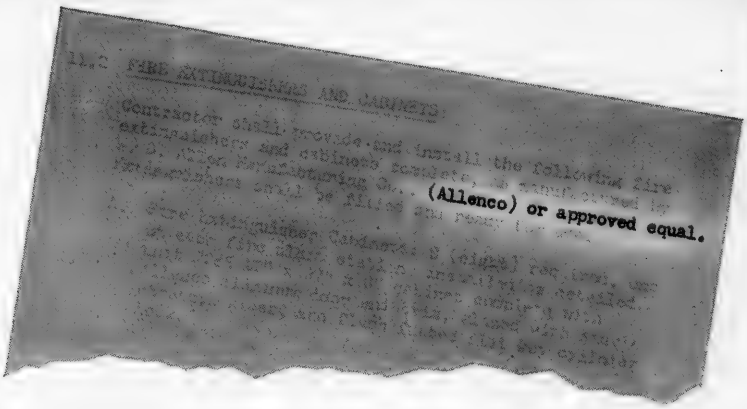


Fig. 7168
19"x22"x5½" I.D.
Holds 50 or 75-feet
of 1½" linen hose

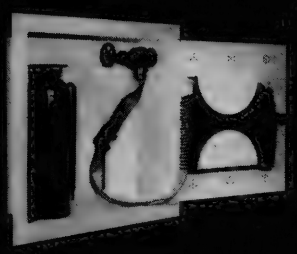


Fig. 7169
26"x27"x8" I.D.

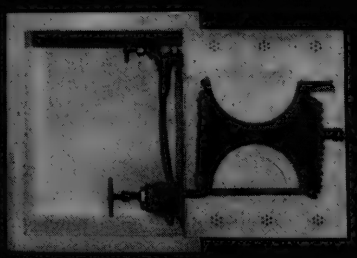


Fig. 7172
24"x30"x8½" I.D.

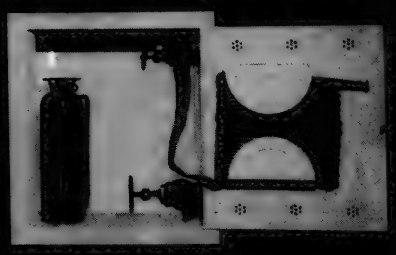
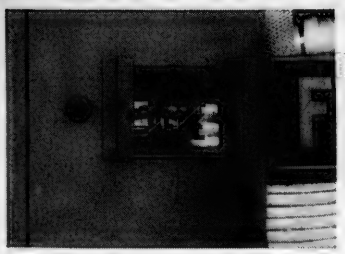


Fig. 7173
27"x30"x8½" I.D.

Each holds up to 100 feet of 1½" linen hose, 50 or 75 feet of Allen-flex hose, or 50 feet of Qua-flex hose, plus choice of extinguishers where shown and Fire Department valve where shown.



Tamper-proof Latch Shield (*optional*) keeps contents safe for emergency, yet breaks clean instantly

Blends Into Any Surface: choice of 3 trims, 2 door styles; finish on the job or by factory to your specs; face-flush vents

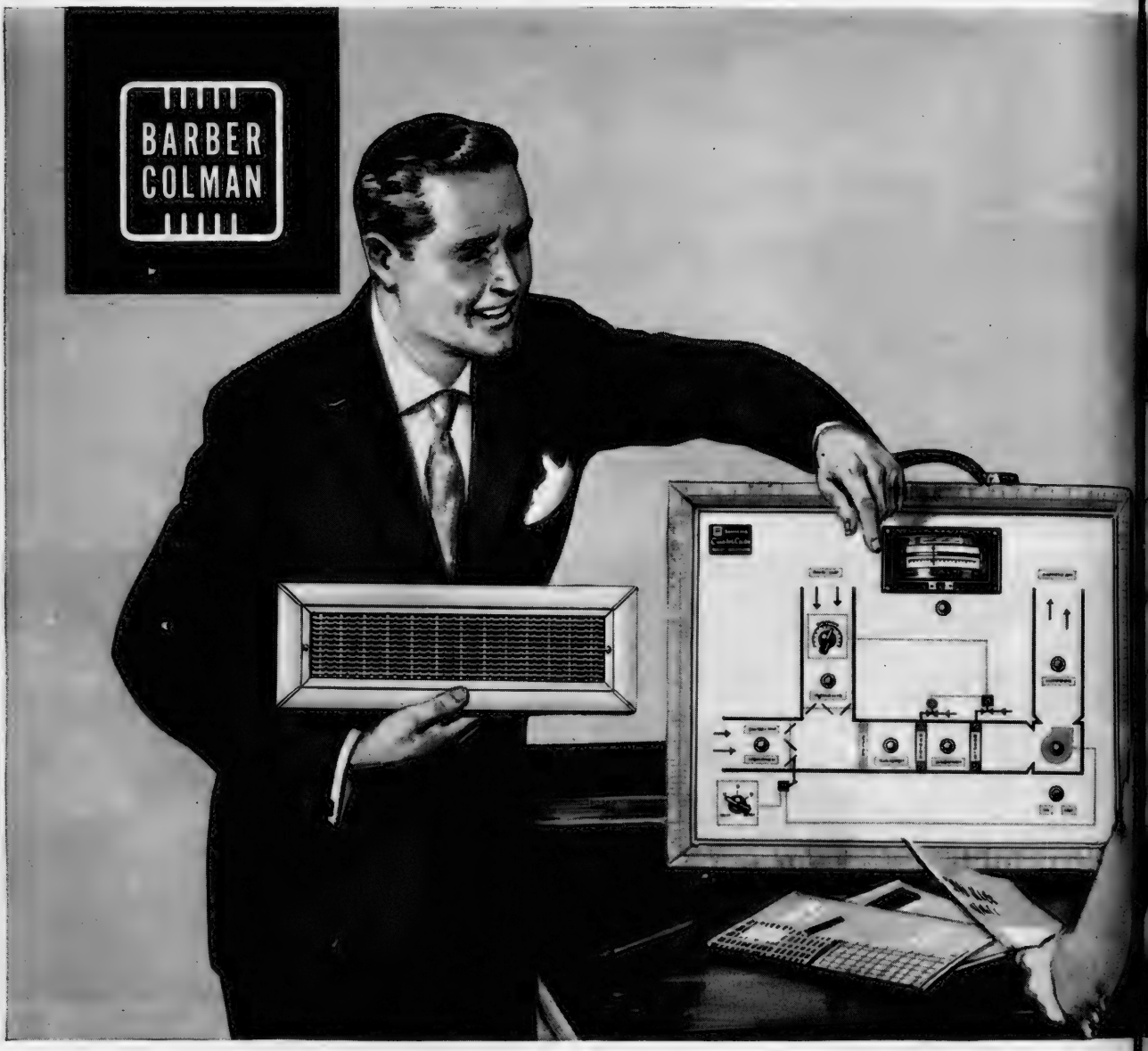
For SELF DEMONSTRATION or DATA phone your Allenco*nsultant* (listed in Yellow Pages) or write . . .

ALLENCO

W. D. ALLEN Manufacturing Co.

Room 500 Allenco Bldg. 566 W. Lake St. Chicago 6

Tell us where to send your copy of this handy digest reference (not a catalog) for specifying or installing non-sprinkler fire protection.



FROM EDMONTON, ALBERTA, TO MEXICO CITY—ONE SOURCE...ONE RESPONSIBILITY

Just look up "Barber-Colman" in the phone book for any of these cities:

Alabama
Birmingham

Arizona
Phoenix

Arkansas
Little Rock

California
Bakersfield
Fresno
Los Angeles
Sacramento
San Diego
San Francisco

Colorado
Denver

Connecticut
New Haven

D. C.
Washington

Florida
Jacksonville
Miami
Tampa

Georgia
Atlanta

Illinois
Chicago
Rockford
Rock Island
Springfield

Indiana
Fort Wayne
Indianapolis
South Bend

Iowa
Des Moines

Kansas
Wichita

Kentucky
Louisville

Louisiana
New Orleans
Shreveport

Maine
South Freeport

Maryland
Baltimore

Massachusetts
Boston
Springfield

Mexico
Mexico City

Michigan
Detroit
Grand Rapids
Saginaw

Minnesota
Duluth
Minneapolis

Missouri
Kansas City
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Nebraska
Omaha

Nevada
Las Vegas

New Jersey
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New York
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North Carolina
Charlotte
Greensboro
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Ohio
Akron
Cincinnati
Cleveland
Columbus
Dayton
Toledo
Youngstown

Oklahoma
Oklahoma City

Oregon
Portland

Pennsylvania
Philadelphia
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Greenville

Tennessee
Knoxville
Memphis
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Texas
Austin
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Dallas
El Paso
Ft. Worth
Houston
Lubbock
San Antonio

Utah
Salt Lake City

Virginia
Norfolk
Richmond

Washington
Seattle
Spokane

West Virginia
Charleston
Morgantown

Wisconsin
Madison
Milwaukee
Oshkosh

Canada
Calgary
Edmonton
Montreal
Regina
Toronto
Vancouver
Winnipeg

try Barber-Colman's co-ordinated approach to high comfort standards!

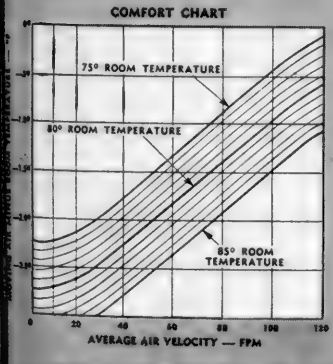
More and more engineers and contractors are learning the value of one responsible source for both Automatic Controls and Air Distribution Products

From first contact until your air conditioning is balanced and checked, your Barber-Colman representative offers co-ordinated products and service on *both* Automatic Controls and Air Distribution.

At the design stage, he provides engineers with invaluable assistance in selection and placement of equipment.

During installation, he checks out control systems and is available for final balancing of the air distribution.

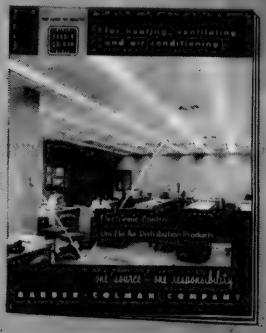
He guarantees not merely the equipment but the final result — a draft-free, ideally controlled system fulfilling today's high comfort standards. Rely on Barber-Colman to help you cope with problems arising from an ever-changing architectural and engineering concept.



COMFORT STANDARDS

This chart developed by Barber-Colman indicates conditions of air movement and temperature in the occupancy zone. Line shown for each average room temperature is limit of satisfactory comfort conditions. Points above the line fulfill Human Comfort Standards. The Barber-Colman "Comfort Engineer" is the one supplier who can assure *proper relationship* of temperatures and air velocities as dictated by this chart. Copies available from your nearby Barber-Colman Field Office on request.

Ask your Barber-Colman Field Office for this new, fully illustrated bulletin detailing advantages of Automatic Controls and Air Distribution system combinations. Just look for the name Barber-Colman in the telephone book for any of the 95 cities listed on the left-hand page of this ad.

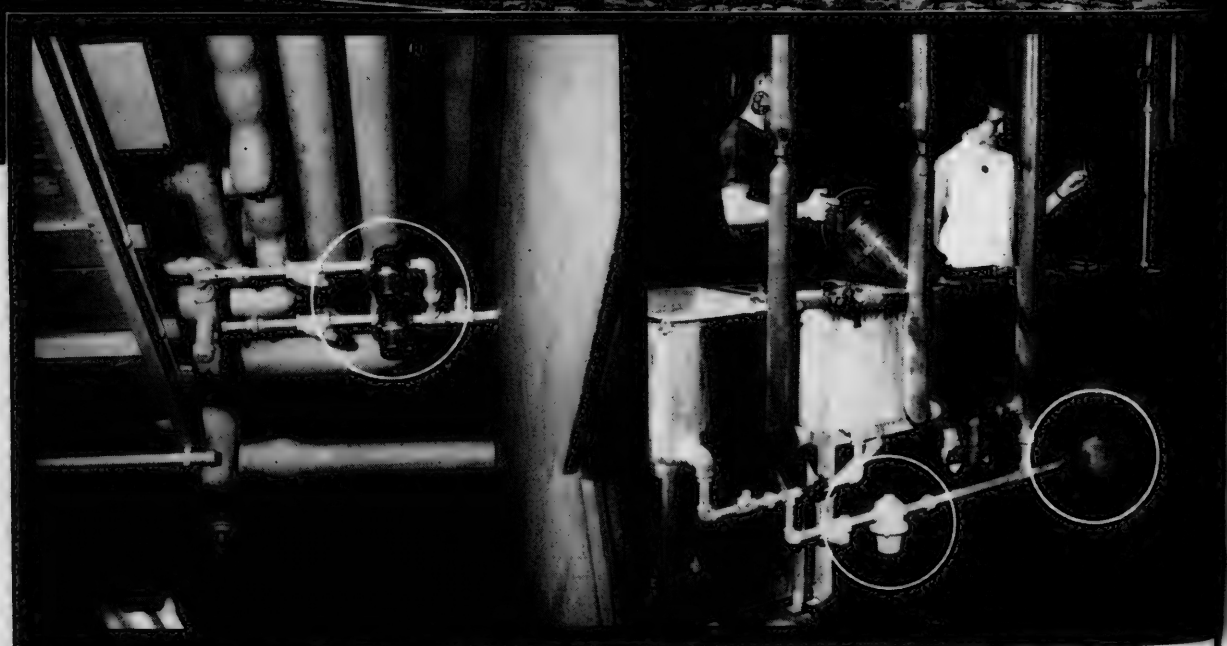


BARBER-COLMAN COMPANY

Dept. F, 1602 Rock Street, Rockford, Illinois

There's a Difference in steam traps!

Illinois TRAPS AT SHEAFFER



BUILDING HEATING. Here are two of the Illinois traps at the Sheaffer plant. A switch to Illinois resulted in perfect comfort temperatures and a reduction of more than one fourth in fuel consumption.

PROCESSING. Plant Engineer John Manshein reports that Illinois traps were the *only* traps among those tested that could function properly on these plating tanks.

CUT FUEL BILL 25%
PEN COMPANY PLANT!

Sheaffer Pen Company, Fort Madison, Iowa. Designed and constructed by The Austin Company.

Plant engineer's tests prove Illinois superiority in both building heating and processing operations

THE PROBLEM

After Sheaffer Pen Company built its modern, air conditioned plant at Fort Madison, Iowa, Plant Engineer John Manshein encountered heating problems. He found that some areas of the building could not be brought up to comfortable temperatures.

WHAT WAS DONE

First, Mr. Manshein made a thorough investigation. As a result of this, he ordered six traps from various manufacturers and put them through his own rigid testing program.

RESULT

These tests led to the installation of Illinois traps throughout the building. *During the following heating season, the building was perfectly comfortable and fuel consumption dropped more than one-fourth!*

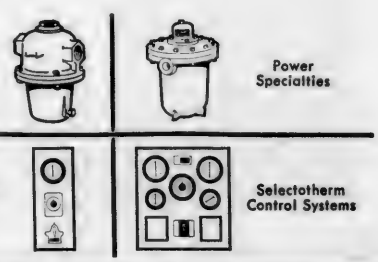
Processing, Too!

Mr. Manshein conducted his own tests, also, on traps serving the plant's many plating, wash and rinse tanks with the same result—a switch to Illinois. He says that Illinois traps were the *only* traps among those tested that could take the very rapid valve openings and closings for prolonged periods.

Select from a complete line of thermostatic traps, float and thermostatic traps and steam traps—25 inches vacuum to 600 lbs. pressure. Write for booklet, "There's a Difference in Steam Traps"—a case study at Sheaffer Pen Plant.

illinois ENGINEERING

Illinois Engineering Company
2035 S. Racine Ave., Chicago 8, Ill.
A Division of American Air Filter Company, Inc.



...now we're cooling

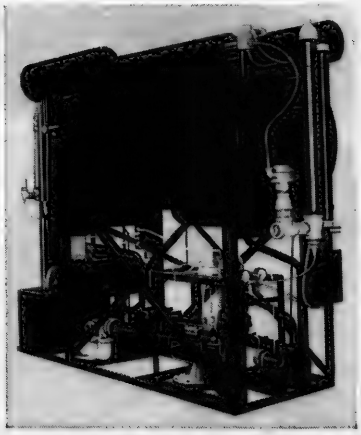
ARCHITECT: CHICAGO BANK EQUIPMENT CO.
GENERAL CONTRACTOR: PAUL H. SCHWENDENER,
7553 SOUTH CHICAGO AVENUE, CHICAGO, ILL.

Specify Arkla-Servel Gas Air

With their new Arkla-Servel Gas Absorptive Cooler, the La Grange Federal Savings and Loan Association keeps customers cool in summer with the same compact system that keeps them warm in winter.

Before installing Gas, a complete study was made of available air conditioning systems. The Arkla-Servel unit—the only 25-ton absorptive cooler—was chosen because it is compact, easy to install, and costs are low for installation, operation and maintenance. No specially trained operating or maintenance personnel are required.

with GAS



Conditioning and you specify years of trouble-free comfort

Only Gas gives these important advantages:

- high efficiency at all times—even during the light loads
- temperature control is constant
- moduiar adjustment of capacity (instant automatic adjustment to match actual cooling requirements)
- dependability of fuel service at all times

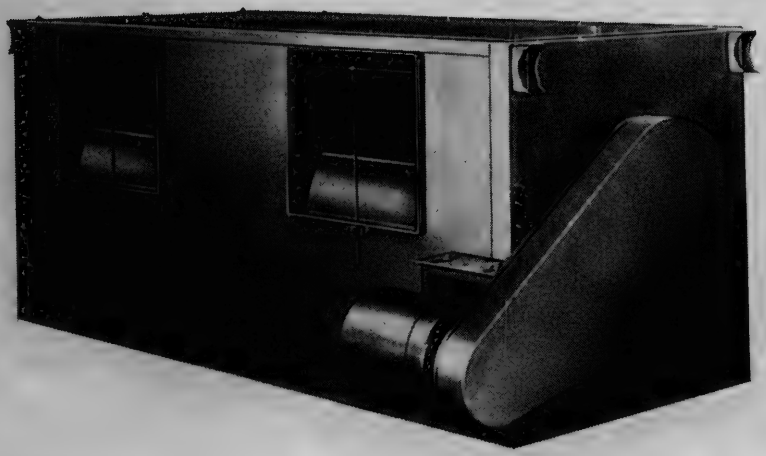
Gas absorptive cooling can put your commercial and industrial clients' heating plant on a year around paying basis. It utilizes low pressure steam to cool water, has no moving parts to wear out, and provides quiet, economical operation. What's more, it's vibration-free.

Take advantage of the consulting services provided by your Gas company. They have trained specialists who have been working with contractors and builders for years. They belong to your associations or affiliations and are familiar with your problems. Check the facts about Gas and you'll see modern Gas air conditioning out-performs all other fuels. *American Gas Association.*

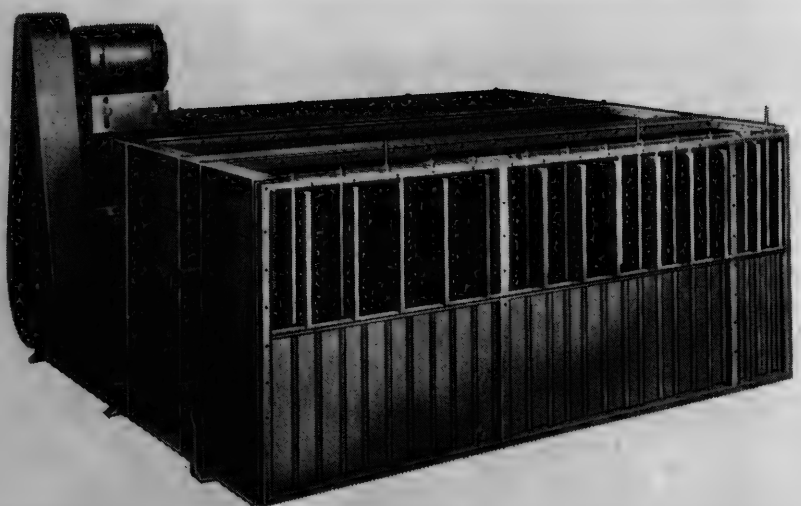
NOW! AMERICAN BLOWER

Heating and Ventilating Unit — Type V gives complete coverage of central-station heating and ventilating requirements. Steam or hot-water heating; large-volume, extra-quiet Sirocco Fans, for adequate heating and for ventilation. Ideal for offices, auditoriums, factory areas, gymnasiums, laboratories, schools and stores. Bulletin 8927.

Lineflow Ventilating Unit — Type L is a quiet, compact air handling unit for commercial and industrial uses. Designed for filtered air supply; fume and foul-air exhaust; air-conditioning zone distribution; and non-fouling kitchen and laboratory hood exhaust. Bulletin 8927.



Multi-Zone H & V Unit — Type VB provides individual zone control of temperature from a single central unit. Utilizes a "blow-thru" arrangement with individual zone dampers at the discharge end. Typical applications: schools, laboratories, offices and stores. Bulletin 8927.



DESIGNS NEW FLEXIBILITY INTO . . .

Heating and ventilating systems tailor-made with standard units

Sectional construction of basic components provides the required capacity, at savings in time, money and space!

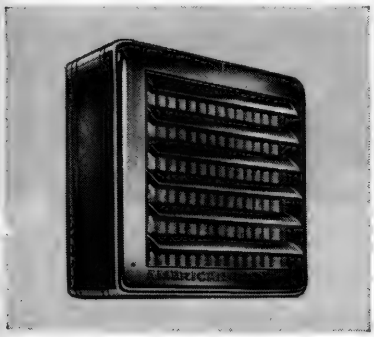
Want the efficiency and operating economy of a "tailor-made" heating or ventilating system? Need the lower initial installed cost of pre-engineered, "ready-made" components? Build around one of these three new H & V Units by American Blower!

American Blower Heating and Ventilating Units offer broad capacity coverage, with eleven sizes to handle from 600 to 66,000 cfm. New flexible design and sectional construction give a bigger selection of efficient combinations and space-saving arrangements to fit your requirements.

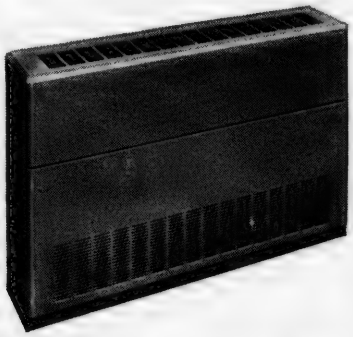
Units, coils and accessories assemble into a custom system at a packaged price. For example, there are eight unit arrangements based on fan rotation and discharge; four types of heating coils in a variety of arrangements with either top or bottom by-pass; and accessories such as filter boxes, face and by-pass dampers, damper-mixing boxes, and floor-base combinations.

Every American Blower H & V component is precision-made for fast mounting and low-cost installation. Units are easy and economical to maintain and service because motors, drives and bearings are externally mounted, easily accessible. For full details, send for Bulletin 8927.

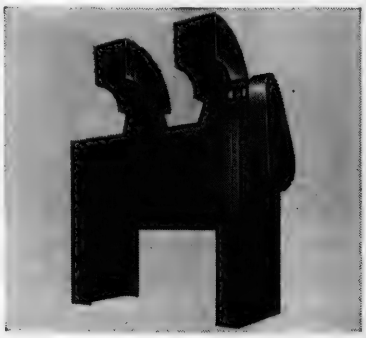
Remember: When you specify American Blower, you get equipment that's designed, engineered and manufactured to work together . . . *plus* one-source responsibility for its performance. Branch offices in 73 cities offer local product help or nationwide sales-service coordination. American-Standard,* American Blower Division, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.



Venturafin® Unit Heaters—for steam or hot water. Quiet; adjustable louvers. Horizontal or vertical. Bulletin 9017.



Cabinet Heaters—attractive, quiet. Models for all applications. Steam, hot water; to 1860 cfm. Bulletin 9617.



Industrial Unit Heaters—high-capacity, quiet. Universal cowls. Steam, hot water; 7 sizes, 4 arrangements. Bulletin 7727.

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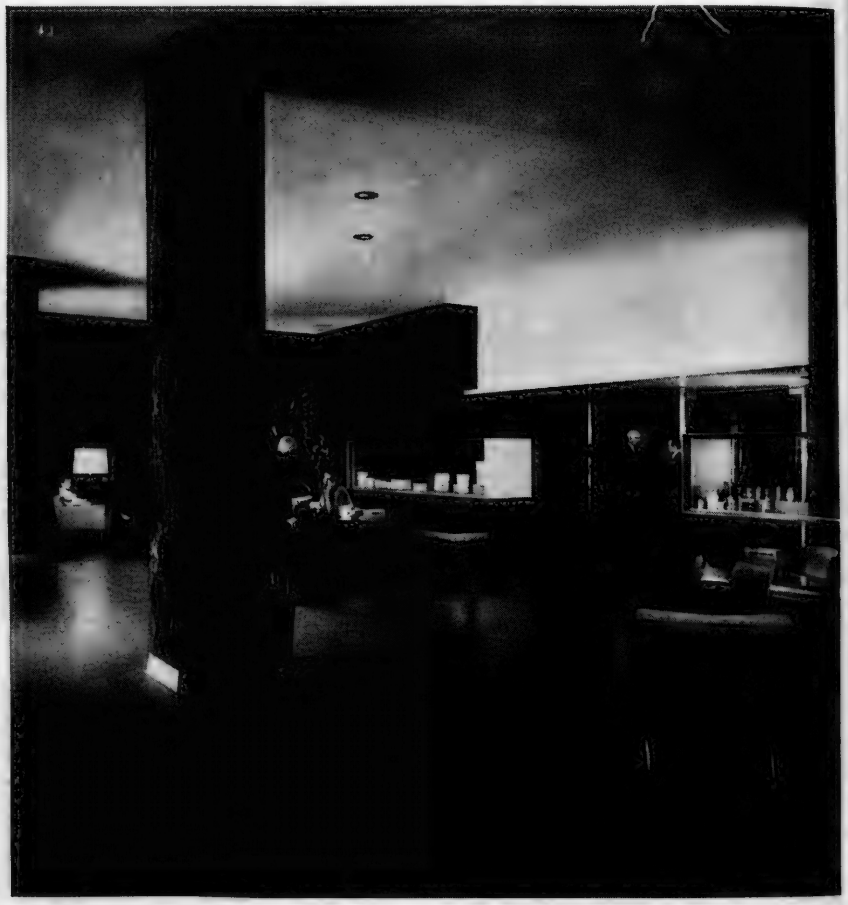
AMERICAN-Standard
AMERICAN BLOWER DIVISION

CONTINENTAL CAN CO., INC. / Metal Division, Research & Development Center, Chicago, Illinois

Leading Research Laboratories across the nation depend on Powers for accurate temperature and humidity control in test rooms and work spaces.

Outstanding research library is shown below.



Architects and Engineers: Schmidt, Garden & Erikson, Chicago • **General Contractor:** George A. Fuller & Co.
Contractors: S. J. Reynolds Co., Inc., Chicago • R. R. Hayward Co. • Carrier Corp., Chicago, Ill.

(c1)

POWERS Air Conditioning Control System helps CONTINENTAL CAN COMPANY Research produce the newest ideas in modern containers

Food-testing kitchen above and impartial tasting panels in Continental Can Co.'s laboratory are accurately held at a constant temperature and humidity by Power's control.

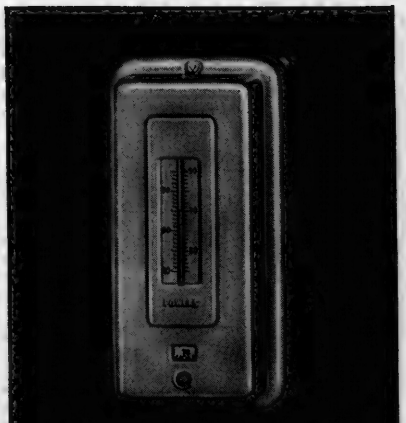
Research experts here are constantly at work making improvements in design, construction, materials and equipment to make better cans for hundreds of products.

Offices, work areas, conference rooms, library, cafeteria, lobby and constant temperature test rooms between −10°F to 130°F are all provided with Powers individual space control.

Central fan systems supply conditioned air to perimeter and interior systems. Under the window type units in the perimeter areas are controlled by Powers Heating-Cooling Thermostats regulating Powers PACKLESS Control Valves. Temperatures at key points throughout the plant are continuously indicated by a strip recorder.

Are You Planning a New Building or modernizing an old one? Solving complex temperature and humidity control problems in this and other prominent laboratories demonstrates Powers engineering skill and know how.

When you ask your architect or engineer to include a Powers Control System you can be sure of TOP QUALITY—there is no better.



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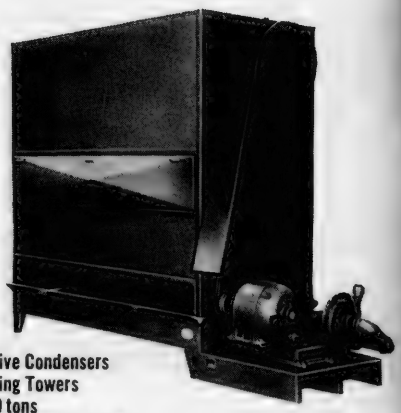
THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS | *Offices in chief cities in U.S.A. and Canada*

65 Years of Automatic Temperature and Humidity Control

Vertical drawing boards shown below are 15 ft. long by 8 ft. high.

You can count on HIGHER PROFITS WITH Curtis AIR CONDITIONERS



Evaporative Condensers
and Cooling Towers
up to 100 tons
Air handling units to match.

Packaged Liquid Chillers—
7½ to 100 tons—F-12 or F-22.
With room console units to provide
controlled cooling and heating
without duct work.

HERE'S WHY...

MAXIMUM DEPENDABILITY

Each CURTIS unit is backed by 104 years of engineering and manufacturing experience . . . one of many reasons why CURTIS air conditioning equipment operates at maximum efficiency with a minimum of maintenance.

CUSTOMER SATISFACTION

The long operational life and minimum service requirements of CURTIS air conditioning, combined with peak performance, assures satisfied customers.

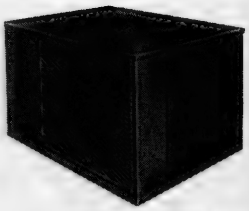
PRE-SOLD PROSPECTS

National advertising beamed at virtually every prospect category helps *pre-sell* Curtis equipment for you. CURTIS provides sales and promotional aids to make your selling job *easier*.

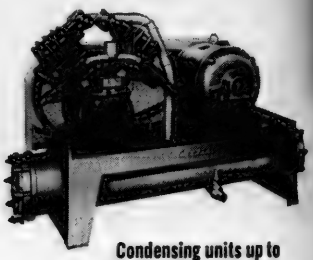
PRICED FOR PROFITS

All Curtis air conditioning equipment is *competitively* priced, with a very generous profit margin *for you!*

Packaged
air conditioning
units—
3 through
50 tons.



Packaged Air Cooled Air
Conditioning Units—2
through 7½ tons. Residential
and commercial applications.



Condensing units up to
100 tons—F-12 or F-22.

REMEMBER—
you can count on Curtis

OUR 104th YEAR

MANUFACTURING COMPANY • REFRIGERATION DIVISION

1999 Kienlen Ave., St. Louis 20, Mo.

Represented in Canada by — T. M. Hall Ltd., 30 Milner St., Montreal West 28, P. Q., Canada

C-35

Specify RECO

Skilled RECO craftsman seals head of cement-lined storage heater for Jamestown Festival

VIRGINIA'S JAMESTOWN FESTIVAL
Architects & Engrs.—Ballou & Justice, Richmond, Va.
Plumbing Contr.—Service Plumbing and Heating Co. Williamsburg, Va.
General Contractor—John W Daniels, Danville, Va.
Heating & Plumbing Jobber—Noland Co., Inc. Newport News, Va.

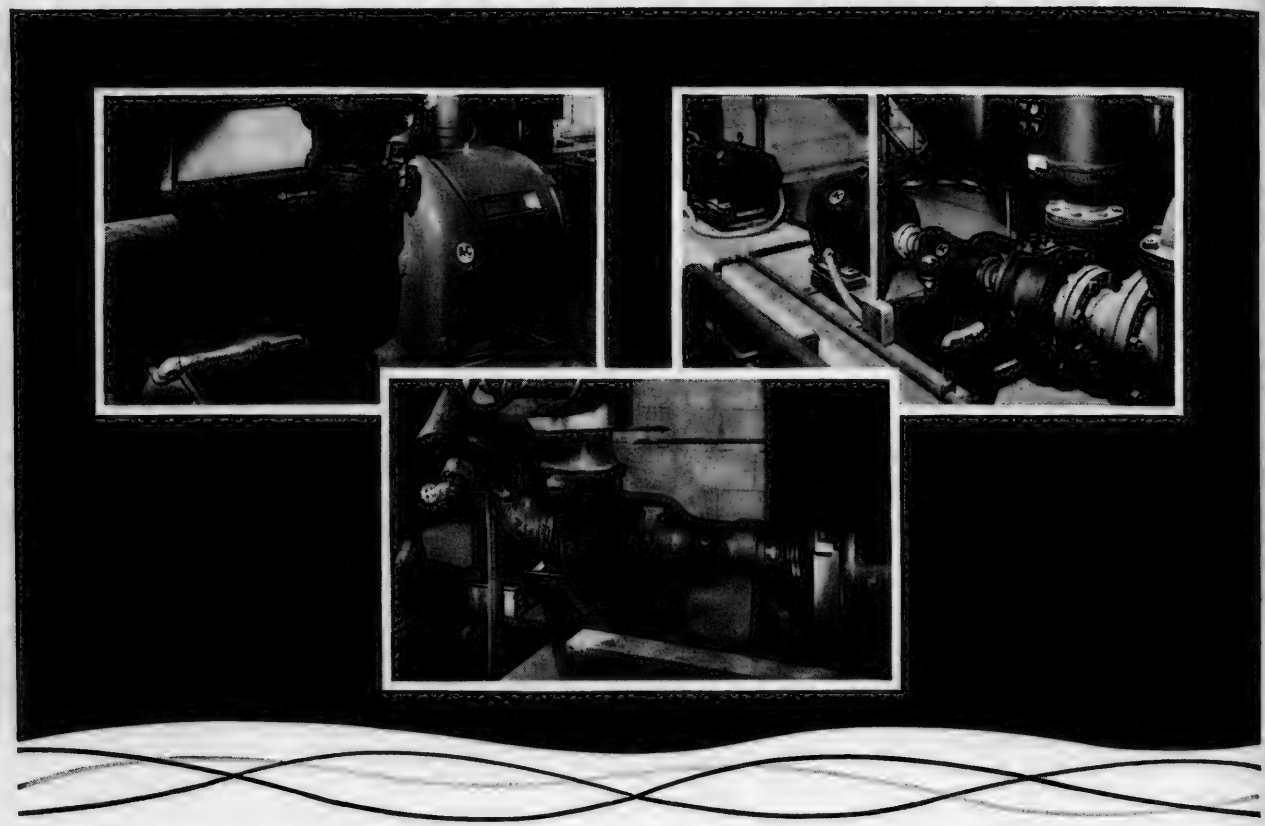
RECO Makes Hot Water History at Virginia's Jamestown Festival Park

More than two million visitors will walk back through history this year at Virginia's Jamestown Festival Park. But they will never be more than a few steps away from the comforts of today. A RECO cement-lined hot water storage heater keeps plenty of piping hot water always on tap in the festival's group of administrative buildings — the Reception Center, Gift Shops, Restrooms, and Mermaid Tavern. For these same buildings, a RECO converter supplies hot water for the forced circulation, modular type heating system.

For guaranteed quality, fair price and quick delivery on *your* next heating job — SPECIFY RECO.

Write for free catalogs and name of RECO representative nearest you today: RECO, Dept. P, 7th & Hospital Sts., Richmond 5, Va.

RICHMOND ENGINEERING CO., INC.



for 99% of all air-conditioning applications...

there's a RIGHT Allis-Chalmers PUMP

TYPICAL of Allis-Chalmers pump line is this model with variations in both fractional and integral horsepower sizes. All close-coupled models have only two base sizes for the entire range.

WHATEVER the air-conditioning application, there's sure to be the correct Allis-Chalmers pump for the job. The reason: A-C pumps are assembled for *your* application from standard components. This is truly "standardized specialization" — tailored pumps at a mass-production price.

Close-coupled, horizontal, sidewall-mounted and submersible models are all available with a wide choice of mounting methods. Whatever type of conditioning equipment is involved — small and medium-sized tanks, absorption and centrifugal machines; cooling towers, plus other systems — A-C has *the* pump. Capacities to 3200 gpm, heads to 400 feet.

For the pumps you need, contact your A-C representative, distributor or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5635

YOU GET
DOUBLE PROTECTION
against corrosion...
against falling
or splashing liquids

Air intakes and outlets are positioned to provide complete dripproof protection.

TYPE DP
1 to 125 hp

DOUBLY PROTECTED—Wagner DP Motors offer the *double protection* of completely dripproof enclosures and rugged cast iron frames that can take rough handling and resist corrosion.

with WAGNER TYPE DP MOTORS designed to meet more application needs

Wagner Type DP Motors offer the *double protection* of rugged corrosion-resistant cast iron frames and dripproof enclosures so well designed that the DP Motor can handle many applications that formerly required splashproof motors.

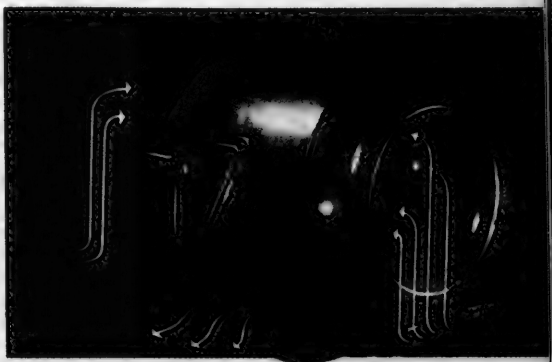
These Wagner Motors are built in the new NEMA ratings that pack more power in less space, are lighter in weight and are easier to maintain.

CAN BE RELUBRICATED—Factory lubrication will last for many years in normal service—but openings are provided to permit the relubrication that adds years to motor life under severe conditions.

SLEEVE BEARING MODELS AVAILABLE

The entire line of ratings through 125 hp is available with ball bearing construction as illustrated, or with steel-backed, babbitt lined sleeve bearings that have high load carrying capacity and provide quieter operation.

Let a Wagner Sales Engineer show you how these motors can be applied to your needs. Call the nearest branch office or write for Wagner Bulletin MU-223.



COOL RUNNING—Specially designed baffles direct cooling air through the motor to reduce stator temperature—thus increasing motor life. Blowers, cast as part of the rotor, move large volumes of air without noise or vibration.

1 to 125 HP—1750 RPM—40°C
NEMA FRAMES 182 through 445U

Wagner Electric Corporation
6400 Plymouth Ave., St. Louis 14, Missouri.

TM58-9

YOU GET
EXTRA PROTECTION
against corrosive...
abrasive or
explosive elements

TYPE EP
Standard TEFC
1 to 100 hp

TYPE JP
Explosion proof
1 to 100 hp

with Wagner totally enclosed motors... protected for longer motor life

If you need motors that will keep production rates up... that will give the continuity of service that is so important to automation... that will operate with complete dependability under the most severe conditions —Wagner totally-enclosed motors are your soundest choice.

Type EP Motors offer protection against corrosion, dust, abrasives, fumes, steel chips or filings. Type JP is explosion proof as well — designed and approved for use in explosive atmospheres.

NEW NEMA FRAMES—These motors are built in the new NEMA Frame sizes from 182 through 445U, with ribs that add mechanical strength and increase the surface cooling area. Effective cooling system adds to motor life.

Let your Wagner Sales Engineer show you how these protected motors can bring you savings on initial motor costs, maintenance costs and continuity of operation.

1 TO 100 HORSEPOWER—4 POLE, 60 CYCLE—NEMA FRAMES 182 THROUGH 445U

Wagner Electric Corporation

6400 Plymouth Ave., St. Louis 14, Missouri. Branches and Distributors in All Principal Cities

HEAVY DUTY BALL BEARINGS

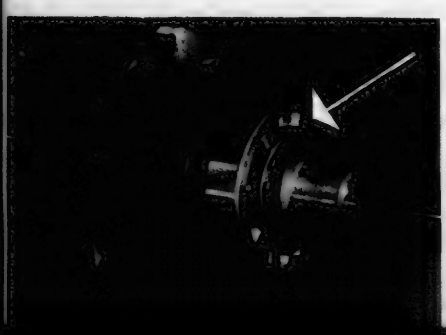
The ball bearings used in these motors are of the highest quality, with more than ample capacity to provide long troublefree service under heavy loads.

BEARINGS CAN BE RELUBRICATED

Factory lubrication will last for many years under normal service, but openings are provided to permit relubrication that adds years to motor life under severe conditions.

SEALS KEEP BEARINGS CLEAN

Both ends of these motors have running shaft seals to keep the bearings clean. Bearing housings are effectively sealed to prevent escape of grease.



WEIRKOTE® — THE RIGHT CHOICE BY EVERY MEASURE

matter what the specifications of your heating or air-conditioning duct work, Weirkote will eet them as only a quality zinc-coated steel can. No other metal can match it.

ke, for instance, the strength and rigidity of Weirkote. It's a natural for spanning large areas ithout bending or buckling and with a minimum use of supporting brackets. Consider, too, its e protection. Its higher melting point makes it provably safer than competing metals. Since cts sometimes carry volatile matter with a low flash point, this protection can be vital.

portant, too, is Weirkote's economy. Made by the continuous process which integrates zinc steel, Weirkote can be worked to the very limits of the steel itself without flaking or peeling. rmanent corrosion resistance is provided in every seam and surface. Which, of course, all adds up onger, maintenance-free life for Weirkote ducts. And its ease of installation cuts cost still further.

er a Weirkote duct installation is in and operating, your clients will find still another reason to glad you specified Weirkote—it's quiet. Noisy creaks and cracks of expansion and contraction minimized. With all these advantages plus economy, you just can't go wrong with Weirkote.

Free Weirkote Booklet

the new booklet on Weirkote today. Write Weirton Steel Company, Dept. N-4, Weirton, W. Va.

WEIRTON STEEL COMPANY

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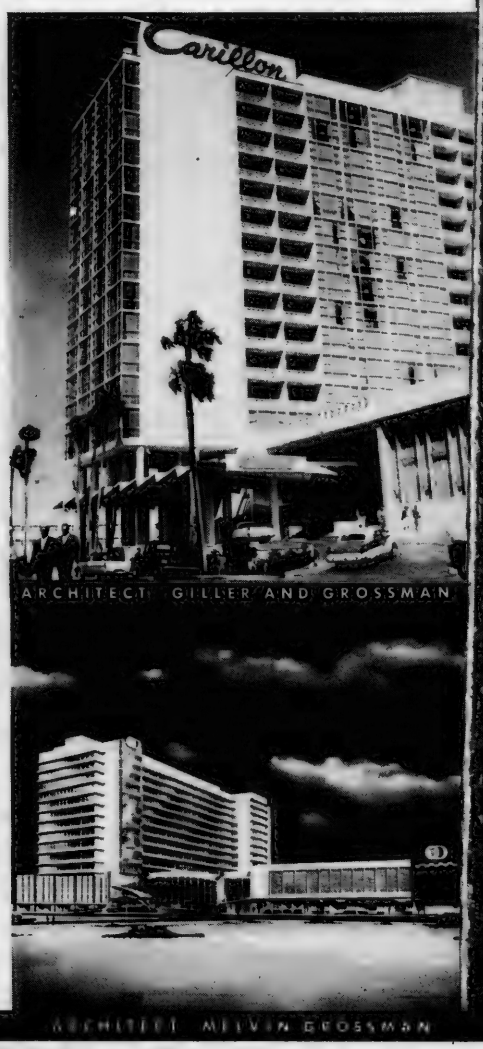
USED WHEREVER THE BEST IS REQUIRED

3 More OF MIAMI'S FINEST rely on J-E SOLENOID VALVES



For quiet, dependable control of air conditioning in every guest suite, Miami's newest luxury hotels—The Carillon, The Deauville and the Dupont Tarleton—all utilize Jackes-Evans Solenoid Valves.

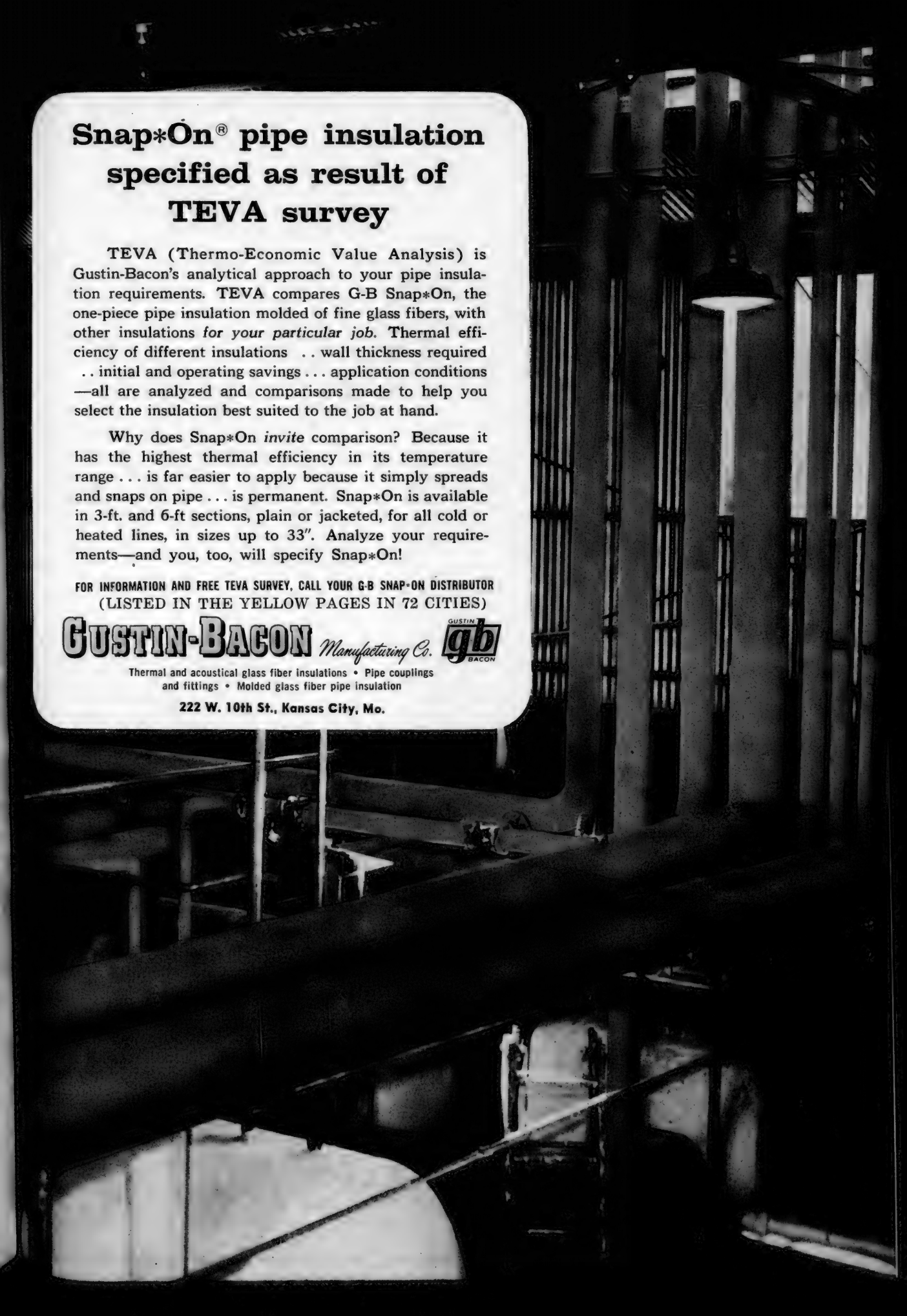
Hill York Sales Corp., air conditioning contractors in co-operation with Graves Refrigeration Co. (J-E wholesaler) selected J-E Solenoid Valves because of their long and proven record of satisfactory service in many other similiar installations. They provide positive, automatic temperature control for heating or cooling —quietly control water flow without fluid shock or chatter.

For completely satisfactory performance, specify and use J-E Solenoid Valves. Call your wholesaler or write direct today.

Controls Division

JACKES-EVANS MANUFACTURING COMPANY

4427 Geraldine Avenue • St. Louis 15, Missouri



Snap*On® pipe insulation specified as result of TEVA survey

TEVA (Thermo-Economic Value Analysis) is Gustin-Bacon's analytical approach to your pipe insulation requirements. TEVA compares G-B Snap*On, the one-piece pipe insulation molded of fine glass fibers, with other insulations *for your particular job.* Thermal efficiency of different insulations . . wall thickness required . . initial and operating savings . . . application conditions —all are analyzed and comparisons made to help you select the insulation best suited to the job at hand.

Why does Snap*On *invite* comparison? Because it has the highest thermal efficiency in its temperature range . . . is far easier to apply because it simply spreads and snaps on pipe . . . is permanent. Snap*On is available in 3-ft. and 6-ft sections, plain or jacketed, for all cold or heated lines, in sizes up to 33″. Analyze your requirements—and you, too, will specify Snap*On!

FOR INFORMATION AND FREE TEVA SURVEY, CALL YOUR G-B SNAP*ON DISTRIBUTOR
(LISTED IN THE YELLOW PAGES IN 72 CITIES)

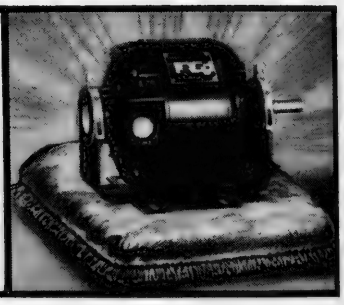
GUSTIN-BACON *Manufacturing Co.* GUSTIN gb BACON

Thermal and acoustical glass fiber insulations • Pipe coupligns and fittings • Molded glass fiber pipe insulation

222 W. 10th St., Kansas City, Mo.

tailor-made for You

. . . and every one a perfect fit



No Sir, no ready-made here. Emerson-Electric motors are custom-engineered for your product . . . *designed* for you, *produced* for you and *priced* for you. It is no longer necessary to design your product around a *standard* motor. Emerson-Electric engineers will work with you through every stage of development. You get the product you want with a motor that EXACTLY suits your purposes . . . a custom-engineered motor.

Call, wire or write Dept. M-301 today, The Emerson Electric Mfg. Co., St. Louis 21, Mo.

EMERSON-ELECTRIC
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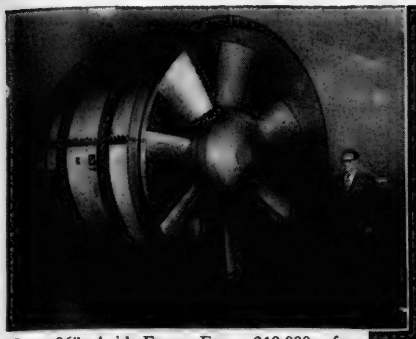
Since 1890



Huge 96" Acid Fume Fan—210,000 cfm "Buffalo" Axial Flow Fan with cast aluminum wheel, installed in a textile mill.

In Stack Hood Exhaust — Easy installation is a big advantage of the duct-size "Buffalo" Axials mounted in these stacks. Hoods give all-weather protection.

FOR TOP AXIAL FLOW FAN EFFICIENCY— IN BIG JOBS OR SMALL— SPECIFY "BUFFALO" AXIALS

"Buffalo" Axial Flow Fans provide extremely quiet and efficient performance. This inherent efficiency is further improved by the "Buffalo" Vaneaxial outlet guide vanes. These carefully engineered vanes re-direct the swirling air at the fan outlet, converting it into increased forward thrust.

These sturdy, reliable fans are light in weight, permitting easy installation. Except for the largest models, no structural support or heavy foundation are required. "Buffalo" Axials can be installed as a section of the duct or stack in hood and other roof exhaust systems.

Duct-size "Buffalo" Axials save space by fitting in close to walls or ceilings. Space-saving installations include service as ventilation, exhaust and industrial air conditioning supply fans. They are widely used for applications ranging from paint spray booth exhaust to boiler room cooling.

"Buffalo" Axial Flow Fans are available for high or low temperatures, corrosive fumes, explosive atmospheres and other severe conditions.

Investigate the many advantages offered by "Buffalo" Axial Flow Fans. Contact your nearby "Buffalo" engineering representative, or write direct for Bulletin 3533-EF.

BUFFALO FORGE COMPANY

480 Broadway • Buffalo, N. Y.

Buffalo Pumps Division • Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

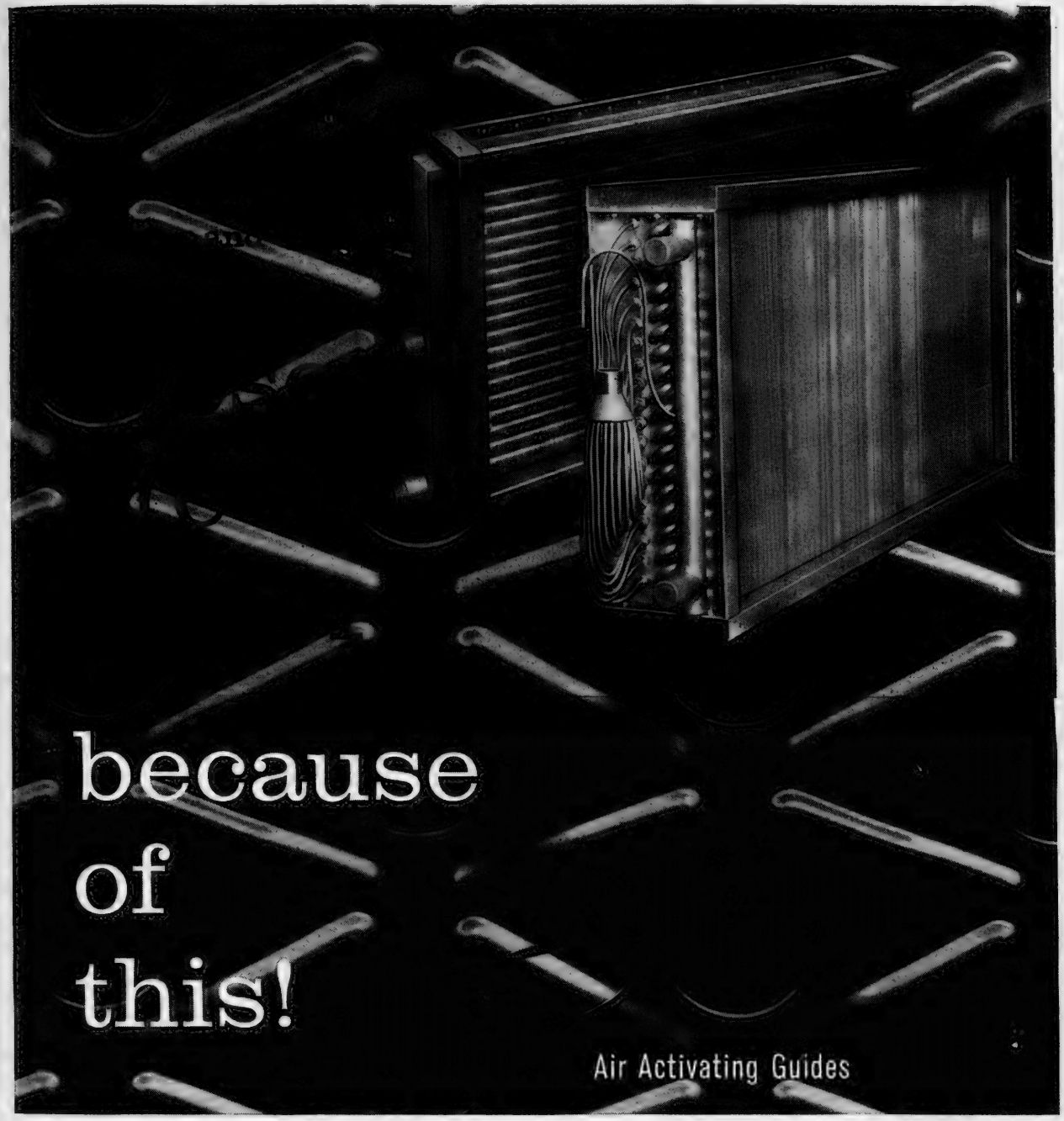
VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
FORCED DRAFT COOLING HEATING PRESSURE BLOWING

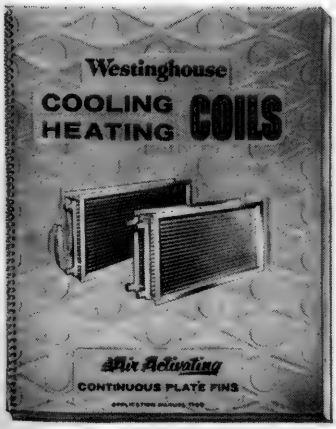
ONLY JENN-AIR EXHAUSTERS OFFER TRUE LOW CONTOUR

The Big Difference is in the Installed Height

To conform with modern construction, low contour in exhausters is the accepted design among architects, engineers and building owners. And Jenn-Air, first to develop low contour spun aluminum exhausters, still engineers the lowest contour of all. Only true measurement of exhauster height is the distance from the roof level to the top of the exhauster. Jenn-Air Quiet-Tested units, when installed, stand 25 to 50% lower than others—yet meet specifications for a discharge height at least 16″ above roof level. This is achieved by Jenn-Air's exclusive method of nesting the motor below the discharge of the exhauster. Thus, the base of the exhauster itself supplies the additional height. In competitive models, with a discharge height of only 9½″, the curb base must be extended higher to attain the 16″ position. Result: overall, installed height of competitive so-called "low contour" exhausters runs 8″ to 10″ more than that of Jenn-Air. Have a Jenn-Air representative show you the "yard-stick test" . . . proof positive that only Jenn-Air Quiet-Tested exhausters offer *true* low contour.

JENN-AIR PRODUCTS COMPANY, INC.
1102 Stadium Drive, Indianapolis 7, Indiana





And more prime surface than any other coil!

Now! New Application Manual with complete data for consulting and designing engineers prepared in the format recommended by the Committee of 100 Prominent Consulting Engineers.

J-80674

Your Sturtevant Division Sales Engineer has your copy. Call him today, or write: Westinghouse Electric Corporation, Department F-6, Hyde Park, Boston 36, Massachusetts.

MARSH PACKLESS RADIATOR VALVES

WHEEL HANDLE

GRADUATED

LOCK AND SHIELD

ANGLE PATTERN

GLOBE PATTERN

CORNER PATTERN (Sectional Below)

MARSH THERMOSTATIC RADIATOR TRAPS

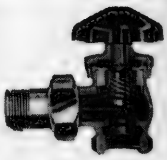
ANGLE PATTERN

STRAIGHTWAY PATTERN

VERTICAL PATTERN

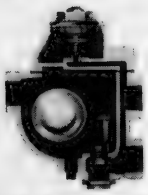
LEFT HAND CORNER PATTERN

RIGHT HAND CORNER PATTERN



CUT OPEN VALVE

F&T TRAPS

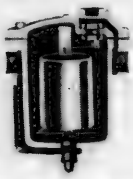


No. 12, REPRESENTATIVE OF WIDE LINE

VENTS

No. 5 VENT, ONE OF MANY

BUCKET TRAPS



No. 500 INVERTED BUCKET TRAP

All the best of their kind!

You probably have made certain Marsh products your standbys without realizing there are a lot more of them just as superlative as the ones you like so well.

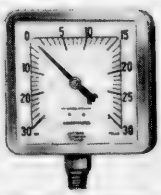
Make the acquaintance of some of them here, but, better still—***Ask for this Marsh Catalog!***

MARSH HEATING EQUIPMENT CO.
Sales affiliate of Jas. P. Marsh Corporation
DEPT. U, SKOKIE, ILL.
Marsh Instrument & Valve Co. (Canada) Ltd.
8407 103rd St., Edmonton, Alberta

MARSH
Heating Specialties since 1865

MARSH BOILER GAUGES

THER-ALTI-METER (Square and Round)



INTERNAL SYPHON (Square and Round)

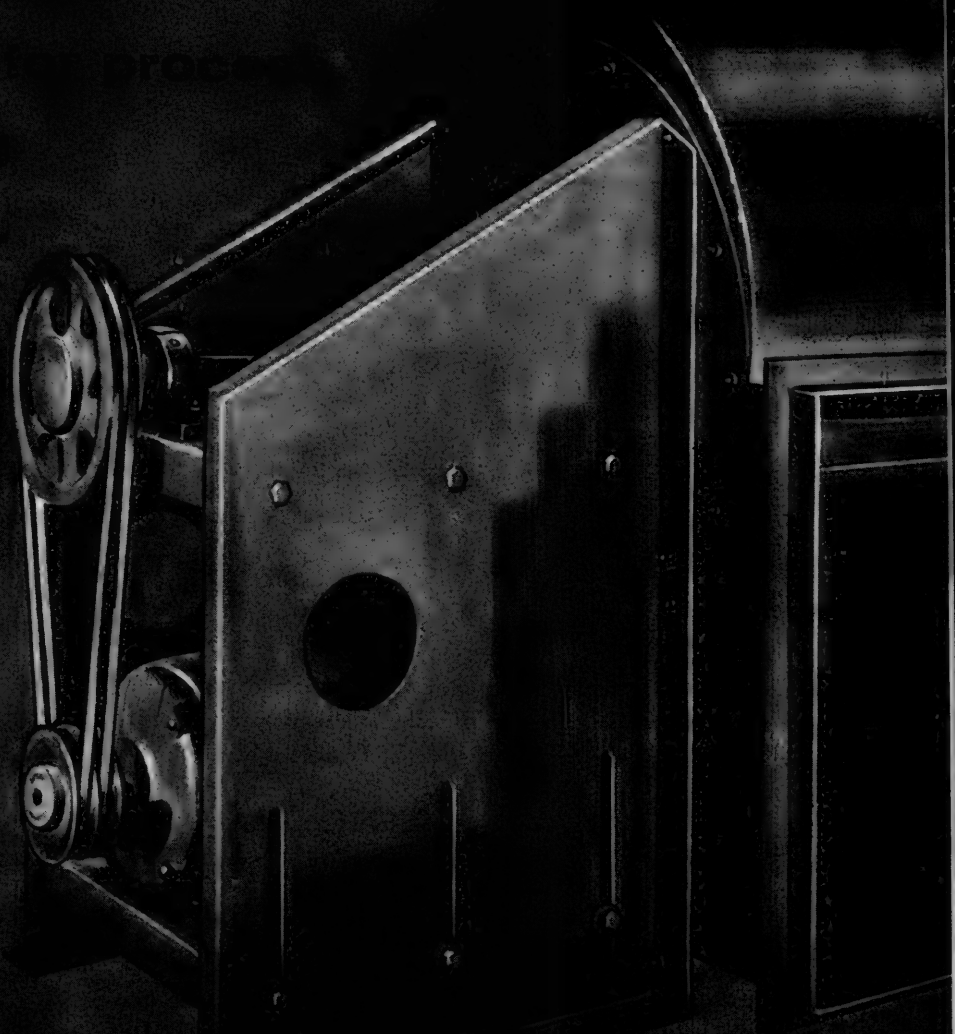
OUNCE-GRADUATED RETARD (Also Compound)

STANDARD (Also Compound)

BIG

The BIG year for BIG performance

GENERAL PURPOSE FANS



nyb

THIS NEW VACUUM HEATING PUMP IS SIZED TO ACTUAL JOB REQUIREMENTS

It's the Nash CSM

No longer is it necessary for the Engineer to accept a vacuum heating pump with air and water capacities based inflexibly upon square feet of equivalent direct radiation. With the flexible Nash CSM he can provide for proper air capacity in accordance with his judgment and experience. For the individual capacities of the separate pumps on the CSM may be varied within a wide range, without buying an oversize receiver and oversize water pumps.

These pumps possess many other features which permit a more efficient utilization of fuel and minimum use of electric power. Low, low, returns reduce installation costs and usually eliminate putting the pump in a pit. Simplicity and efficient operation reduce supervision and maintenance costs. Information regarding this new heating pump development is available immediately upon request.

- ✓ **Increased air capacity induces rapid system response without wasteful overheating.**
- ✓ **Separate air and water pumps individually selected to meet actual job requirements.**
- ✓ **Control system that operates individual pumps only when needed.**
- ✓ **Flexibility permitting addition of radiation without changing basic pump installation.**
- ✓ **Low, low, return line connection.**

NASH ENGINEERING COMPANY
438 WILSON, SO. NORWALK, CONN.

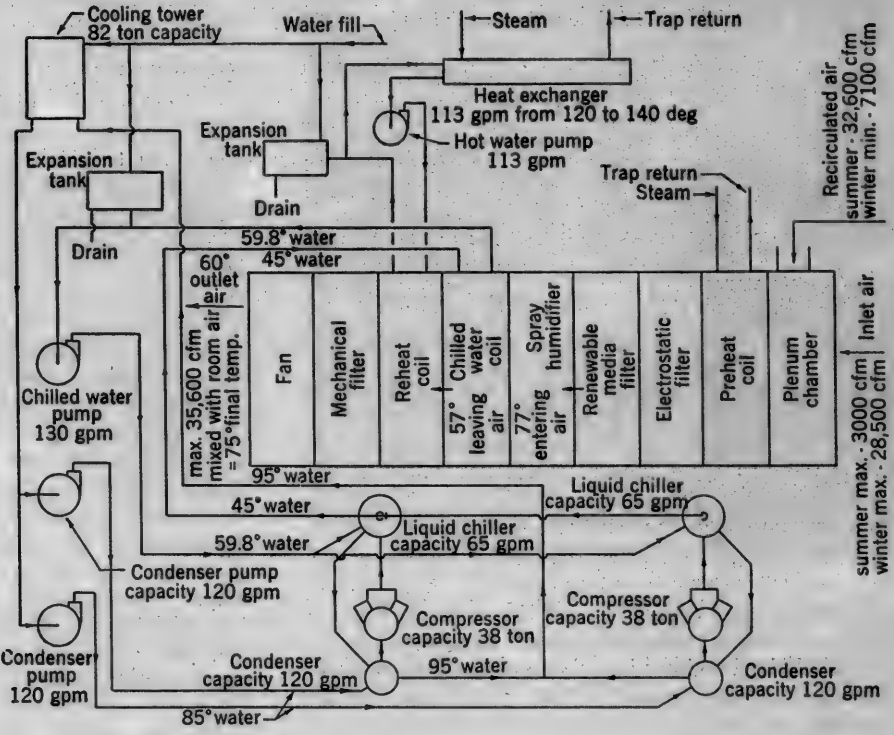


Fig. 1. Diagram of the air conditioning system which serves the computer room, Hawthorne plant, Western Electric Company.

Air Conditioning an IBM Electronic Data Processing Center

J. C. STANCL and C. A. RILEY
Mechanical Engineers, Power and Service Facilities,
Western Electric Company, Chicago, Ill.

Large heat gains result from the operation of electronic equipment installed as part of a data processing center. This article lists the heat load for each of the electronic units, and what was done to cut down the heat load in one installation. Data on air handling equipment and operation are presented.

ELECTRONIC calculating devices produce a large amount of heat, when operating, which must be removed if these units are to function efficiently.

When a decision was made to install an IBM-705 computer in the Western Electric Company Hawthorne Plant, Chicago, Ill., engineers found that it would be necessary to remodel 12,700 sq ft of floor space on the sixth floor to house the computer, and to provide year-round air conditioning for the proper operation of this electronic equipment. A schematic of the air conditioning system is shown in Fig. 1.

The air conditioned portion has a ceiling height of 11 ft 5½ inches, and covers an area of 6235 sq ft made up as follows: Main computer room, 5140 sq ft; tape storage room, 445 sq ft; repair room, 425 sq ft and visitors' viewing gallery, 225 sq ft.

This leaves a balance of 6465 sq ft that is not air conditioned, consisting of the air conditioning equipment room, 1200 sq ft; fan room, 165 sq ft; office area, 4570 sq ft, and a total of 530 sq ft for aisle and corridor space.

Treatment for Windows

To hold down the cost and size of air conditioning equipment, it was necessary, as a first measure, to seal all window openings. This was done by spraying the glass area on the room side with an opaque plastic coating. Next, 2-inch thick foam glass blocks were placed in the window openings with the side nearest the window glass painted with aluminum paint. With this completed, the return air ducts, studding for the new wall, and a blanket of fiberglass insulation with a vapor barrier were installed. Details are shown in Fig. 2. A ¼ inch thick perforated hardboard facing over this insulation provided the finished wall. Acoustic tile was applied to the existing plastered ceiling and provided additional insulation for the ceiling.

Room Conditions

To properly condition the computer area, the equip-

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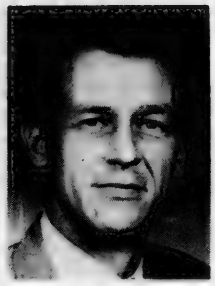


G. A. Riley was born in Chicago, Ill. He attended Purdue University and Northwestern University where he received his B.S. in Mechanical Engineering in 1940. Before coming to Western Electric Company, he was a field engineer on aircraft engines for the Dodge-Chicago Plant. Since 1945, he has been with the Western Electric's Hawthorne Works, specifically in Plant and Factory Engineering Organization.

ment selected was designed to provide a room temperature of 75 deg F when the outside temperature is 95 deg. A relative humidity is maintained of 50% ± 10%. The main air handling unit supplies 35,600 cfm through a preheat coil (when required in cold weather), electrostatic filter, renewable media filter, water spray humidifier, chilled water coil, reheat coil and mechanical filters. The air is discharged by the fan at high velocity (3,500 fpm) through the main duct located on the roof, with branches dropping through the roof into the attic space, thence to the ceiling diffusers. Each diffuser is equipped with an aspirating unit which reduces the velocity to 1,200 fpm. The supply ducts to the tape room, repair room, and the viewing area are each provided with a pressure reducing valve and a small hot water booster because these rooms do not have an appreciable heat load and consequently could, under some conditions, become too cold.

An individual air duct, also containing a hot water booster and pressure reducing valve, supplies air to the bottom of the Central Processing Unit. This machine is equipped with a fan of 4,800 cfm capacity which circulates the conditioned air through the unit, discharging it at the top of the machine into the room. Temperature of the air supplied to the unit is 60 deg and the discharge temperature at the top averages 100 deg.

TABLE I—HEAT LOAD RESULTING FROM IBM UNITS

Unit	BTU/hr	No. of Units	Total, Btu/hr
Central Processing	70,250	1	70,250
Power	4,060	1	4,060
Console	1,710	1	1,710
Card Reader	9,680	2	19,360
Control	8,250	2	16,500
Printer (low speed)	14,000	2	28,000
Printer Control	13,700	2	27,400
Printer (high speed)	20,000	2	40,000
Printer Control	24,000	2	48,000
Card Punch	6,830	1	6,830
Control	13,660	1	13,660
Tape	4,100	30	123,000
Tape Control	9,660	1	9,660
Tape Control	33,000	2	66,000
Magnetic Drum	17,400	2	34,800
Drum Power	5,460	2	10,920
Line Amplifier	10,000	1	10,000

Air Movement

An exhaust fan of 33,000 cfm capacity is provided with dampers to maintain a positive pressure in the room and to control the return and exhaust air. The summer cycle is designed to operate with a minimum outside air intake of 3,000 cfm mixed with 32,600 cfm of return air and to exhaust 400 cfm when the outside temperature is above 50 deg. The winter cycle is designed to operate, starting at 50 deg outside temperature, with a maximum outside air intake of 28,500 cfm mixed with 7,100 cfm of return air and to exhaust 25,900 cfm. As the outside temperature drops below 50 deg these proportions vary, through the operation of the automatic damper control, to the minimum outside air intake requirements. The preheat steam coil is designed to handle 35,600 cfm at 35 deg entering air temperature. By mixing return air with outside air, the coil will supply air at 70 deg to the electrostatic filter. The coil operates at 5 psi steam pressure during the winter months only.

A filter section on the upstream side of the preheat coil was considered, but due to space limitations was not installed. Operation of the unit for the past six months does not show excessive accumulation of dirt or lint on the coils. This means that the coils will need cleaning not more than twice a year. The electrostatic filter consists of a precipitator section that removes dust and smoke from the air by electrostatic attraction. An electrical charge is imposed upon the dust particles through ionization. The charged dust particles enlarge as they settle at the agglomerator or collector. The air stream again picks them up and they are then deposited on the roll media where they remain and are gradually

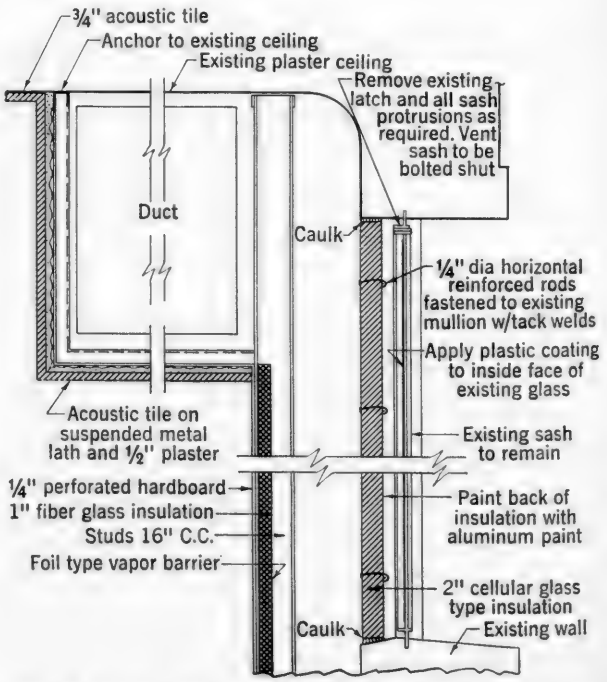

¾" acoustic tile
Anchor to existing ceiling
Existing plaster ceiling
Remove existing latch and all sash protrusions as required. Vent sash to be bolted shut
Duct
Caulk
¼" dia horizontal reinforced rods fastened to existing mullion w/tack welds
Apply plastic coating to inside face of existing glass
Acoustic tile on suspended metal lath and ½" plaster
Existing sash to remain
¼" perforated hardboard
1" fiber glass insulation
Studs 16" C.C.
Foil type vapor barrier
Paint back of insulation with aluminum paint
2" cellular glass type insulation
Caulk
Existing wall

Fig. 2. Section through the room wall to show steps taken to reduce heat gain.

TABLE 2—HEAT LOAD—IBM ROOM

Unit	Btu per Hour			
	Tape Storage	Machine Repair	Main IBM Area	Viewing Gallery
Personnel	360	1,440	1,800	1,080
Lights	3,420	4,790	37,620	4,590
Building Heat Gain	5,335	7,290	48,300	6,480
Machine Load ..			530,150	
Solar Load	——	1,220	2,375	2,000
	9,115	14,740	620,245	14,150

rolled up in the mat and disposed of when the mat is replaced. Humidity is added by the use of the water spray which provides saturated air at all times. The unit is also provided with an eliminator section which changes the air direction three times to remove water from the air stream. In passing through the spray coil dehumidifier section, the air temperature drops through the dew point to a temperature of 57 deg and 95% relative humidity. It is then passed over the reheat coil, which is a hot water coil, to provide warmer air when the computer equipment is not in operation. The air continues through a set of mechanical air filters which remove any dust that may have passed through the humidifier and chiller sections. As the cool air enters the area, it mixes with the warm room air maintaining the design conditions at 75 F deg and 50% relative humidity. Pneumatic controls are used to regulate the proper operation of the air conditioning system.

With this type of construction, the calculated heat load was 928,000 Btu of which 530,150 Btu was created by the IBM equipment listed in Table 1.

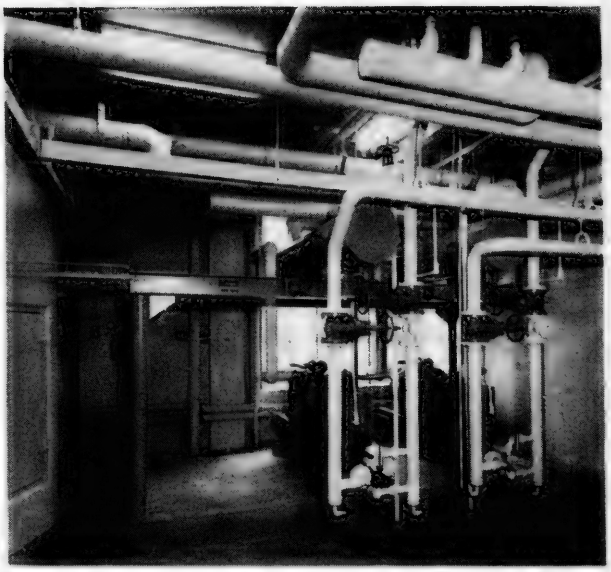


Fig. 3. View showing the refrigeration equipment. Space is left for standby equipment.

The balance of the heat load is made up of building heat gain, light, personnel, outside air, motor load and solar load. See Table 2 which lists the heat load according to these items.

In addition there is a heat load of 209,200 Btu per hr resulting from outside air, and 60,550 Btu per hour from motors in the air stream of air conditioning units. These items, added to the heat load of the IBM room give a total of 928,000 Btu per hr.

1957 Unit Heater Sales Up Over 1956

Shipments of unit heaters and unit ventilators in 1957 totaled $69,745,000 as compared to $67,253,000 in 1956, according to the Bureau of Census, U. S. Department of Commerce. Shipments of heat transfer coils, air washers, and power roof ventilators also showed an increase.

Fan and blower shipments were down from $230,487,000 in 1956 to $206,380,000 in 1957. Total shipments of the Fan, Blower and Unit Heater Group showed an increase from $185,882,000 in 1951 to $311,143,000 in 1957. Detailed figures for 1951 to 1957 follow:

FAN AND UNIT HEATER SHIPMENTS, 1951-57

(In thousands of dollars)

Item	1957	1956	1955	1954	1953	1952	1951
Fan and blower group, total[1]	206,380	230,487	231,499	205,065	189,729	142,656	122,397
Centrifugal fans and blowers[1]	101,551	102,094	106,880	95,032	98,127	69,654	64,632
Propeller fans	68,891	96,736	92,482	82,597	65,705	49,780	39,345
Axial fans	16,265	14,792	16,248	13,506	14,094	15,278	10,543
Parts for fans and blowers	19,673	16,865	15,889	13,930	11,803	7,944	7,877
Power roof ventilator group, total	21,027	15,683	(NA)	(NA)	(NA)	(NA)	(NA)
Unit heater group, total	81,140	77,612	69,080	58,069	58,373	53,308	61,891
Unit heaters	45,194	48,758	41,008	35,453	37,998	35,760	45,295
Unit ventilators	24,551	18,495	19,273	15,243	12,924	9,680	8,899
Heat transfer coils	10,836	9,991	8,458	6,982	7,021	7,584	7,291
Parts for unit heaters and unit ventilators	559	368	341	391	430	284	406
Air washers	2,596	2,313	1,313	1,371	1,133	1,224	1,594
Grand total	311,143	326,095	301,892	264,505	249,235	197,188	185,882

NA Not available.

[1] Value of positive displacement blowers and turbo-blowers is included to the amount of $26,678,000 in 1953, $28,641,000 in 1954, $32,802,000 in 1955, $25,109,000 in 1956 and $24,672,000 in 1957. Figures for previous years do not include the value of these products and to this extent are not comparable with data for 1953-1957.

CENTRAL HEATING IN THE USSR

I. F. LIVTCHAK

Assistant Director, Institute of Building Service Equipment
Academy of Construction and Architecture of the USSR

-Part One-

All of us are interested in knowing the progress of the art of heating and ventilating in Russia. To satisfy this curiosity, we are publishing, in a three-part series, this report, delivered at an international conference in Paris. It neatly summarizes not only current practice of the profession in the Soviet Union, but details some of the important projects still in the development stage.

Part One, which follows, begins with a brief description of the climatic conditions in the USSR, after which the author discusses one-pipe hot water heating systems, prefabricated pipe and tube assemblies, shop-fabricated radiant panels built into walls, and high-resistance valves.

This paper, originally entitled "Developments in Central Heating for Urban Structures in the USSR," is translated by permission of P. Guerin, assistant director, "Annales de L'Institut Technique du Batiment et des Travaux Publics," Paris, the publication in which the paper appeared. His cooperation, and that of R. Cadiergues, director, Comite Scientifique et Technique de L'Industrie du Chauffage et de la Ventilation, who secured permission of the author, made this American publication possible.

THE climate of most of the territory of the U.S.S.R. is distinctly colder than that of some countries in Europe and other continents.

This fact is brought out by the climatic data shown for various cities in Table 1. The table also gives the difference between indoor temperature 18C[64.4F] and the mean temperature for the coldest month in each city, expressed in percent of the corresponding difference for Moscow (taken as 100).

TABLE 1—COMPARISON OF TEMPERATURES IN VARIOUS CITIES OF THE WORLD

(From data in Keppen's work, "Base de la climatologie")

City	Mean Temperature, deg C.			Difference between Inside Temp. and Temp. for Coldest Month, in % of Moscow Diff. as 100
	Coldest Month	Warmest Month	Annual	
Moscow	—10.8	18	3.6	100
Leningrad	— 7.7	17.5	4.1	93
Peking	— 4.5	26.4	11.9	78
Oslo	— 4.2	17.3	5.8	77
Budapest	— 2.3	21.8	11.3	70
Vienna	— 1.7	19.6	9.2	68
Prague	— 1.5	19.0	8.8	68
New York	— 0.8	22.8	11.1	65
Copenhagen	— 0.4	17.0	7.7	64
Berlin	— 0.3	18.8	9.1	64
Paris	+ 2.3	18.3	10.1	55
Tokyo	+ 3.0	25.4	13.8	52
Madrid	+ 4.5	24.7	13.6	47
Rome	+ 6.6	24.6	15.3	36

It follows from the data in this table that operating costs as well as cost of initial installation for heating are highest in the U.S.S.R.

These facts, together with the diversity of kinds of fuel locally used for heating in various regions of the vast extent of the U.S.S.R., have imposed certain specific conditions on the development of heating engineering in our country.

To improve comfort and efficiency, all urban buildings and those in worker settlements of more recent construction in the U.S.S.R. are provided with central heating systems as a general rule. In 1956, for example, 73% of all government-built dwellings were provided with central heating systems.

The most widespread type of central heating system is hot water heating with radiators; this system provides highly satisfactory conditions of health and cleanliness, and its operation is economical. Standard temperatures (taken as basis of estimates) of water in such systems: in hospitals and quarters occupied by small children, 85C[185F] in incoming and 65C[149F] in return lines; dwellings and public buildings, ordinarily 95C[203F] and 70C[158F] respectively, sometimes 90C[194F] and 70C [158F]; in industrial buildings, such installations may be supplied with hot water at a temperature above 100C[212F].

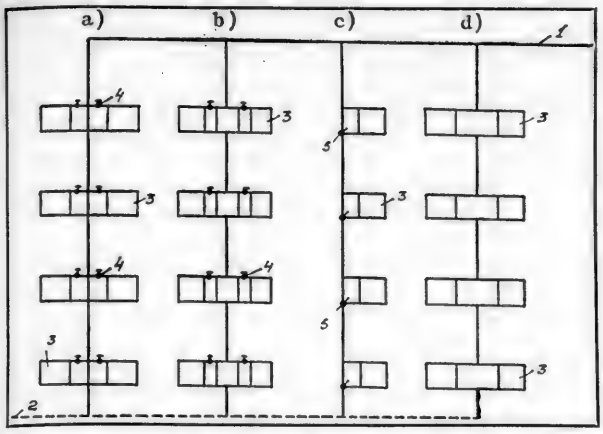


Fig. 1. Diagram of single-line heating systems with different arrangements of heating units on risers. (a) System with by-pass sections, centered on riser. (b) System with by-pass sections moved out from riser. (c) System with three-way valves. (d) Circulating system without valves (used when adjustment during installation is not required). 1. Outgoing line. 2. Return line. 3. Heating units. 4. Double control valves. 5. Three-way valves.

The heating systems, usually forced-circulation, are laid out on various patterns: two mains with top and bottom headers, or one main with risers, and infrequently horizontal distribution lines for each floor.

In the course of the past ten years, the single-line system, using the layouts represented in Fig. 1, has been most widely employed. The popularity of single-line heating systems is due to their greater thermal and hydraulic stability compared to two-line systems. Besides, the single-line system is simpler to install because only half as many risers are required, and these do not require any bends. When branches are exposed, the appearance of the installation is better with one line than with two.

One of the factors that held up the spread of the single-line heating system was the lack of simple and dependable methods of hydraulic calculation.

At the present time, such methods have been developed; one method, for example, is set forth in P. N. Kamenev's book, *Heating and Ventilating, Part I*, 1957. To simplify these calculations, nomographs, tables and even a special slide rule have been devised. The use of such tables and nomographs has served to cut down the time needed to figure a single-line system to a third or quarter; consequently such calculations are now no more time-consuming than those for two-line systems. Use of the slide rule for calculating such systems cuts the cost of the work in half. The advantages of single-line systems as mentioned above, together with the simplified calculating methods, have made it possible to go in for extensive adoption of such systems in practice; consequently, at least 75 to 80% of all residential buildings now under construction are being provided with single-line systems and by-pass sections.

In long-range systems, the common practice is to use a set of circuits of equal length, since in that case it is easier to provide for even distribution of water circulation among the risers. Even for long range systems, however, use has begun to be made of unequal-length circuits, which are more economical of piping. To equalize losses between short-distance and long-distance circuits in such systems, unequal temperature drops are used, smaller in the short-distance risers and larger in the long-distance risers.

Extensive adoption of such systems, beginning especially in Leningrad, has been made possible by improved and simplified methods of calculation.

Heating systems are usually installed in prefabricated assemblies comprising one-story riser sections with branches to heating units and control valves fitted on the branches, sets of lines for pumps and boilers, distribution-line sections etc.

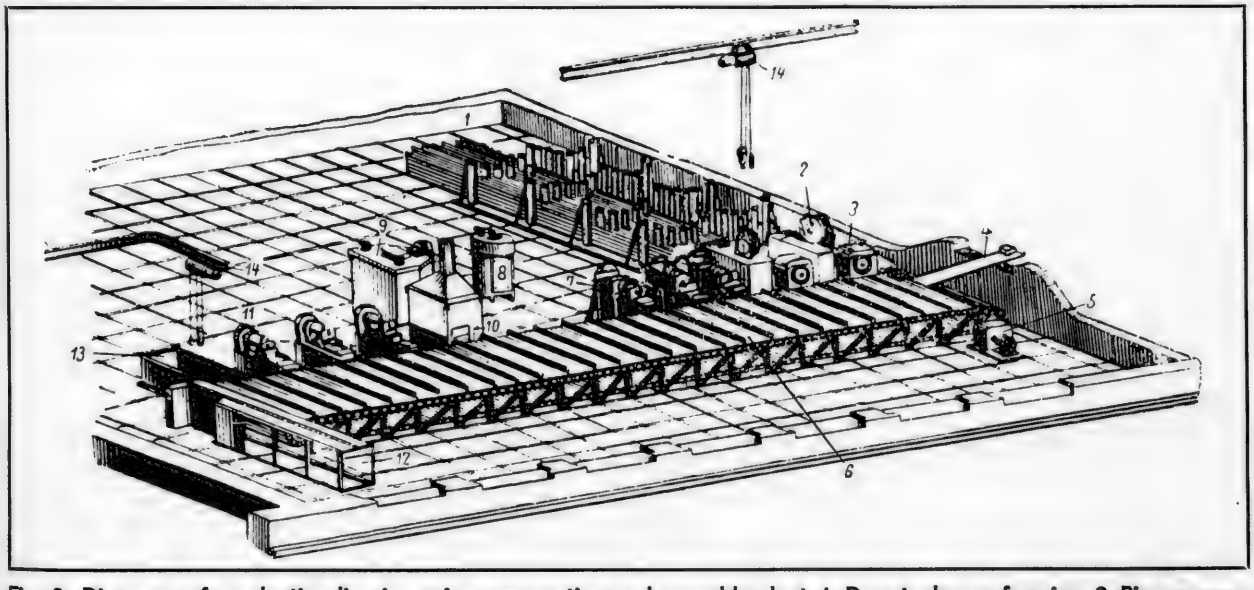


Fig. 2. Diagrams of production line in a pipe preparation and assembly plant. 1. Day stockroom for pipe. 2. Pipe measuring station. 3. Cutter for cutting pipe to length, Shirinkin type. 4. Supply chute for valves and fittings. 5. Electric motor and speed reducer. 6. Paddle conveyor. 7. Threading machine. 8. Pipe bender, Spiridonov type. 9. Bending machine for pipe up to 3 inches. 10. Welder's station. 11. Screw fitting station. 12. Inspection and loose parts table. 13. Tank for leakage testing of finished assemblies. 14. Traveling hoist.

These prefabricated assemblies are made in specialized factories or else in central assembly shops. Pipe fabrication and assembly plants located in large cities having major construction programs are equipped with production lines, beginning with a store room with compartments for various diameters of pipe. The means of marking pipe from the store room is fed by means of a linkage actuated by foot pedal. Marking is done with semi-automatic measuring devices. When marked, the pipe is conveyed along for cutting and stops automatically when the place to be cut is under the wheel of the cutter. After cutting to length and burring the ends on the inside, threads are cut by means of threading machines placed along the production line; then the pipe is automatically conveyed to the bending machines, and thereafter screwed together and welded if necessary. The last operation is compressed-air testing of the finished assemblies, immersed in water. Pipes are welded automatically or semi-automatically in some plants.

The use of prefabricated pipe assemblies makes possible considerably faster installation of heating systems; it cuts field costs as much as 70%, saving up to 40% on the total job of heating-system installation.

At the present time, all central heating enterprises have their centralized pipe assembly shops or plants handling not less than 70 to 80% of all pipe used for heating installations. Recently adopted standardized construction plans include heating system installation drawings; these are designed for use in fabricating pipe assemblies not only for a given installation in progress, but also for stockpiling pending shipment to building sites as required, like other factory-made equipment.

To man centralized pipe assembly prefabrication plants and shops supplying such assemblies for central heating systems to the many construction sites all over the country, specialized bodies of workers, foremen, and engineers have been organized in the U.S.S.R.

Mechanization of operations in plants and shops has substantially increased the productivity of labor engaged in pipe fabrication, at present reaching 90 running meters [295 ft] of pipe per production man-day.

A flow sheet of a production line for making pipe assemblies in one of these specialized plants is illustrated in Fig. 2.

The heating unit most commonly used in central heating systems is the cast-iron radiator, which has a longer service life (because of greater corrosion resistance).

One of the most widespread types of radiators is illustrated in Fig. 3.

Among new radiator heating systems of some interest, mention should be made of heating systems with decentralized mixture of superheated water (Fig. 4); such a system has been used successfully in a trial structure.

Such a system, laid out on the one-line principle, can be used in buildings connected to municipal heat supply. It is divided into two sections; in the first, water flows through the risers from the bottom up, entering the radiators at the bottom connection and leaving cooled at the top connection. In this section, the superheated water (temperature above 100C[212F]) enters the radiator directly, cooling to 95C[203F]. Then the temperature of all the radiator surface is the same and equal to the water temperature at the outlet of the unit, or 95C [203F], which is not above the limit imposed by hygienic considerations.

The other section of the system calls for no special comment, being laid out on a conventional pattern and cooling the water to 70C[158F].

Use of a heating system with decentralized mixture of superheated water will allow a saving of as much as 10% on heating units and up to 5% on pipe (by weight).

Besides, the system avoids the necessity of installing ejector pumps to mix the return water with superheated water entering the building from outside heating mains.

Contrary to the situation in two-line systems, it is not possible to regulate the quantity of heat given up by one-

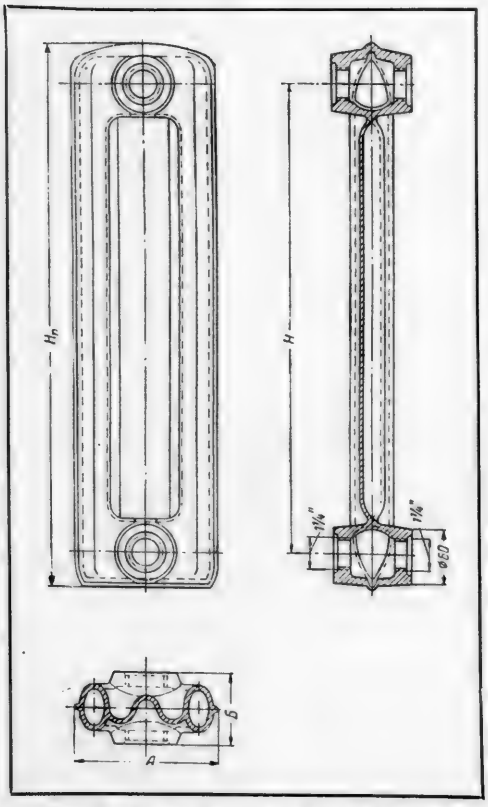


Fig. 3. Most widespread type of cast-iron radiator.

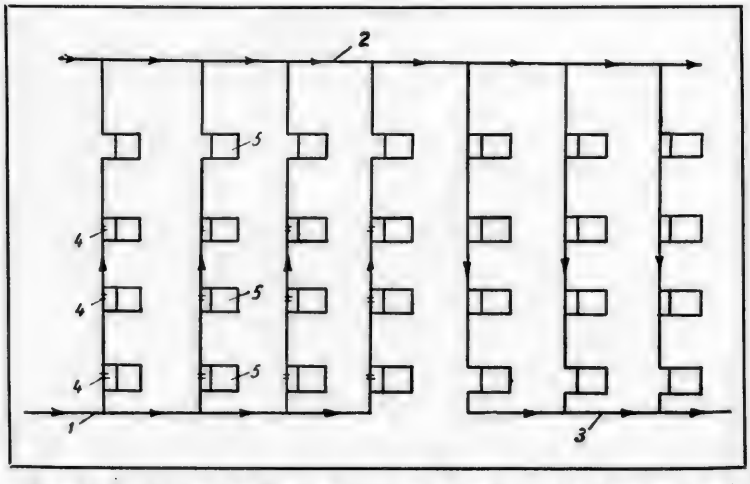
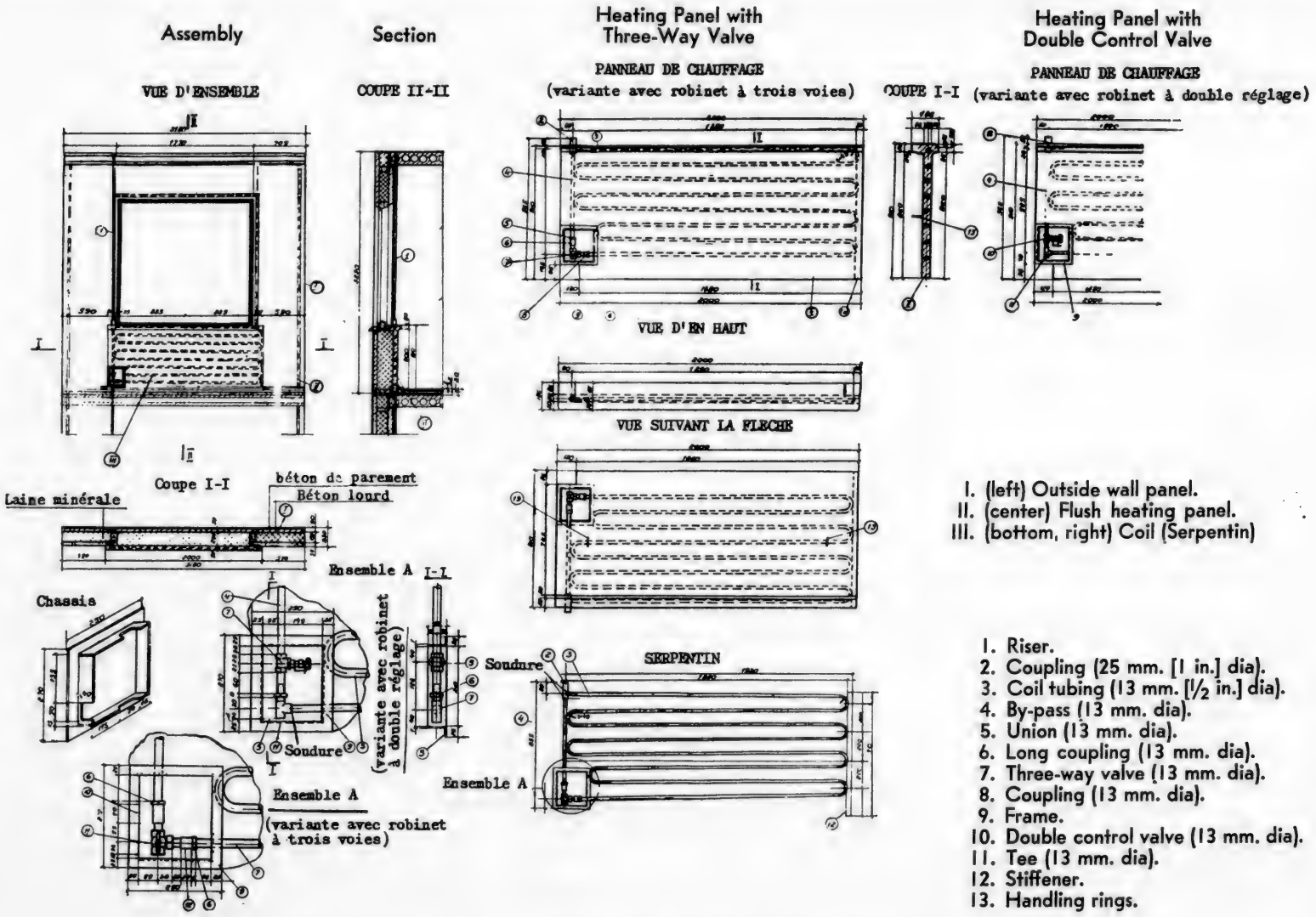


Fig. 4. Diagram of heating system with decentralized mixing of superheated water. 1. Supply line for superheated water at nominal temperature. 2. 95C [203F] water line. 3. 70C [158F] water return line. 4. Diaphragms. 5. Heating units.



I. (left) Outside wall panel.
II. (center) Flush heating panel.
III. (bottom, right) Coil (Serpentin)

1. Riser.
2. Coupling (25 mm. [1 in.] dia).
3. Coil tubing (13 mm. [1/2 in.] dia).
4. By-pass (13 mm. dia).
5. Union (13 mm. dia).
6. Long coupling (13 mm. dia).
7. Three-way valve (13 mm. dia).
8. Coupling (13 mm. dia).
9. Frame.
10. Double control valve (13 mm. dia).
11. Tee (13 mm. dia).
12. Stiffener.
13. Handling rings.

Fig. 5. Multilayer outside wall panel with heating element.

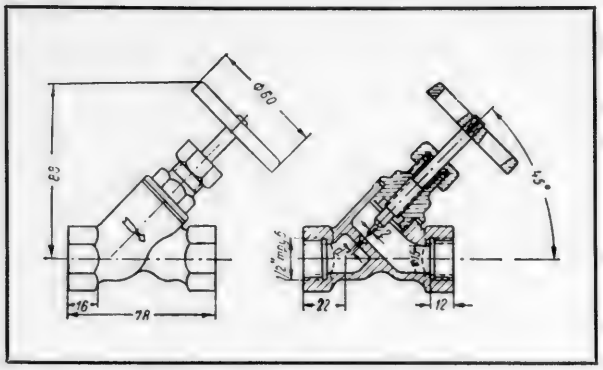


Fig. 6. High-resistance valve.

line heating systems by controlling the quantity of water entering the system, since a decrease, for example, of the flow of water in the system will have very little effect on the higher heating units and will very sharply decrease the quantity of heat given off by the lower units.

On the other hand, so-called quantitative regulation of heating systems is nevertheless highly desirable in certain instances. Consequently, side by side with extended use of single-line heating systems, work on improving two-line heating systems is continuing.

One major improvement in such systems results from the use of high-resistance valves (up to 300 kg per sq m [0.427 psi] or more) on branch lines to radiators.

The resistance in such a valve (Fig. 6) is provided by a web with a small orifice 1.5 to 4 mm [0.06 to 0.16 inches] in diameter; this orifice may be cleared, if clogged, by a point set on the end of the valve stem.

The provision at each radiator of a resistance comparable in value to that of the entire heating system improves distribution of water among the units. Besides, the use of high-resistance valves avoids the danger of hydraulic imbalance inherent in the two-line heating system with forced circulation; such imbalance may result from variations in water temperature of incoming and return lines in the course of operation as a result of outside temperature variations.

Operating tests of experimental heating systems with high-resistance valves have proven quite satisfactory.

Construction of buildings with large prefabricated blocks and panels, using panels completely finished including interior, in size corresponding to an entire room, has been common in the U.S.S.R. for some years. In such buildings, use of the radiator heating systems described above held back industrialization of construction, and frequently delayed occupancy of completed buildings because of incomplete heating installations.

In order to overcome these disadvantages, it has been considered desirable to integrate all possible components of service installations with the structural elements of the building, and produce them in the plants fabricating such elements.

Accordingly, panel heating systems have begun to be used in the U.S.S.R. in the last three or four years, where the heating elements, consisting of steel tubing, are imbedded in the concrete of the outside wall panels or in the partition panels.

A typical example of outside wall-panel construction with heating elements imbedded when making the panels is illustrated in Figs. 5 and 7.

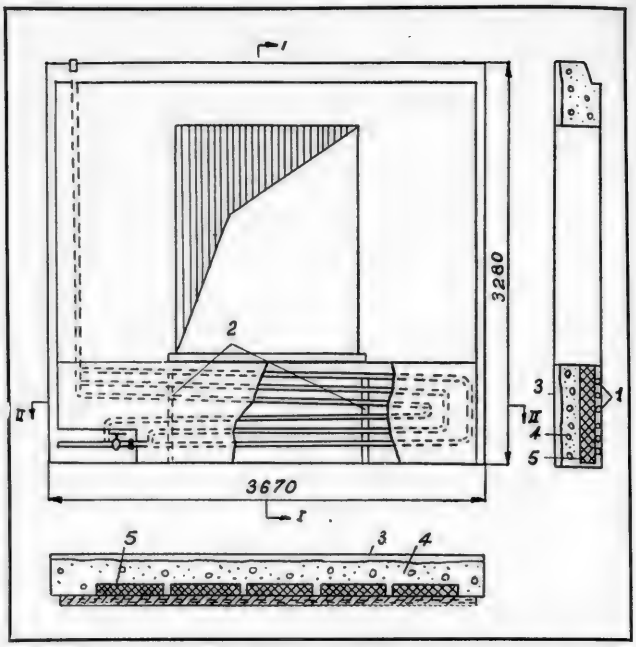


Fig. 7. Outside wall panel with heating element and riser imbedded. 1. Heating element. 2. Stiffener plate 3. Facing concrete. 4. Slag concrete. 5. Heat insulation.

If the panel comprises a single layer of slag concrete for example (Fig. 7), and provided the bearing strength of the fill-in panels is computed with a sufficient margin, not only the heating element but also the riser will be imbedded in the inner layer of the panel, made of heavy concrete. If the panel is in several layers and the heating element cannot be placed in the supporting walls for some reason, it is placed under the window in the concrete curtain (Fig. 5).

In the latter case, the window sill integral with the heating panel also serves as heating surface.

In both cases, to reduce heat losses, suitable heat insulation is placed behind the heating element, as may be seen in Fig. 5, to deflect the flow of heat towards the interior space.

Riser installation on the job is limited in the former case, when the risers are imbedded in the panel, to connection (by welding) of the riser ends of the upper and lower panel; in the latter case, when not imbedded in the outside wall panel, installation involves connection of the projecting nipples of the heating panels set one upon another. This is done with a straight section of pipe, which may be concealed or exposed.

Adoption of these systems in place of the radiator heating systems widely used at present substantially increases the proportion of shop assembly and the quality of installation.

Besides, replacement of cast-iron radiators by concrete heating panels, when these operate with a heating medium having the same thermal characteristics, reduces metal cost three to three-and-a-half times. When the heating panels are operated with water at nominal temperatures of 115C[239F] and 90C[194F], maintaining the temperature of the heating surface at or below 90C[194F], the saving of metal is still greater.

Parts 2 and 3 of Central Heating in the U.S.S.R. *will appear in subsequent issues.*

(Continued from last month's Data Sheet)

HEAT LOSSES (0° to 70°) THROUGH DOUBLE-HUNG WOOD WINDOWS

Opening, Ft. and In.		Area, Sq. Ft.	Heat Loss through Glass, Btu per Hr.	Crack, Ft.	Infiltration Loss, Btu per Hr.		Total Window Loss, Btu per Hr.	
Width	Height				Weather-stripped	Not Weather-stripped	Weather-stripped	Not Weather-stripped
1′ 8″	3′ 2″	5.29	418	11.34	340	556	758	974
	3′ 6″	5.85	462	12.00	360	588	822	1050
	3′ 10″	6.40	506	12.66	380	620	886	1126
	4′ 2″	6.96	550	13.34	400	654	950	1204
	4′ 6″	7.52	594	14.00	420	686	1014	1280
	4′ 10″	8.07	638	14.66	440	718	1078	1356
	5′ 2″	8.63	682	15.34	460	752	1142	1434
	5′ 6″	9.19	726	16.00	480	784	1206	1510
	5′ 10″	9.74	770	16.66	500	816	1270	1586
	6′ 2″	10.30	814	17.34	520	850	1334	1664
	6′ 6″	10.86	859	18.00	540	882	1399	1741
2′ 0″	2′ 6″	5.00	396	11.00	330	539	726	935
	2′ 10″	5.66	448	11.66	350	571	798	1019
	3′ 2″	6.34	501	12.34	370	605	871	1106
	3′ 6″	7.00	554	13.00	390	637	944	1191
	3′ 10″	7.66	606	13.66	410	669	1016	1275
	4′ 2″	8.34	660	14.34	430	703	1090	1363
	4′ 6″	9.00	712	15.00	450	735	1162	1447
	4′ 10″	9.66	764	15.66	470	767	1234	1531
	5′ 2″	10.34	818	16.34	490	801	1308	1619
	5′ 6″	11.00	870	17.00	510	833	1380	1703
	5′ 10″	11.66	922	17.66	530	865	1452	1787
	6′ 2″	12.34	976	18.34	550	899	1526	1875
	6′ 6″	13.00	1028	19.00	570	931	1598	1959
2′ 4″	2′ 6″	5.83	461	12.00	360	588	821	1049
	2′ 10″	6.59	521	12.66	380	620	901	1141
	3′ 2″	7.39	585	13.34	400	654	985	1239
	3′ 6″	8.16	645	14.00	420	686	1065	1331
	3′ 10″	8.92	706	14.66	440	718	1146	1424
	4′ 2″	9.72	769	15.34	460	752	1229	1521
	4′ 6″	10.49	830	16.00	480	784	1310	1614
	4′ 10″	11.25	890	16.66	500	816	1390	1706
	5′ 2″	12.05	953	17.34	520	850	1473	1803
	5′ 6″	12.82	1014	18.00	540	882	1554	1896
	5′ 10″	13.58	1074	18.66	560	914	1634	1988
	6′ 2″	14.38	1137	19.34	580	948	1717	2085
	6′ 6″	15.15	1198	20.00	600	980	1798	2178
2′ 8″	2′ 10″	7.56	598	13.66	410	669	1008	1267
	3′ 2″	8.46	669	14.34	430	703	1099	1372
	3′ 6″	9.35	740	15.00	450	735	1190	1475
	3′ 10″	10.23	809	15.66	470	767	1279	1579
	4′ 2″	11.13	880	16.34	490	801	1370	1681
	4′ 6″	12.02	951	17.00	510	833	1461	1784
	4′ 10″	12.90	1020	17.66	530	865	1550	1885
	5′ 2″	13.80	1092	18.34	550	899	1642	1991
	5′ 6″	14.69	1162	19.00	570	931	1732	2094
	5′ 10″	15.57	1232	19.66	590	963	1822	2195
	6′ 2″	16.47	1303	20.34	610	997	1913	2300
	6′ 6″	17.36	1373	21.00	630	1029	2003	2402

HEAT LOSSES (0° to 70°) THROUGH DOUBLE-HUNG WOOD WINDOWS

Opening, Ft. and In.		Area, Sq. Ft.	Heat Loss through Glass, Btu per Hr.	Crack, Ft.	Infiltration Loss, Btu per Hr.		Total Window Loss, Btu per Hr.	
Width	Height				Weather-stripped	Not Weather-stripped	Weather-stripped	Not Weather-stripped
3′ 0″	2′ 10″	8.49	672	14.66	440	718	1112	1390
	3′ 2″	9.51	752	15.34	460	752	1212	1504
	3′ 6″	10.50	831	16.00	480	784	1311	1615
	3′ 10″	11.49	909	16.66	500	816	1409	1725
	4′ 2″	12.51	990	17.34	520	850	1510	1840
	4′ 6″	13.50	1068	18.00	540	882	1608	1950
	4′ 10″	14.49	1146	18.66	560	914	1706	2060
	5′ 2″	15.51	1227	19.34	580	948	1807	2175
	5′ 6″	16.50	1305	20.00	600	980	1905	2285
	5′ 10″	17.49	1383	20.66	620	1012	2003	2395
	6′ 2″	18.51	1464	21.34	640	1046	2104	2510
	6′ 6″	19.50	1542	22.00	660	1078	2202	2620
3′ 4″	2′ 10″	9.42	745	15.66	470	767	1215	1512
	3′ 2″	10.56	835	16.34	490	801	1325	1636
	3′ 6″	11.66	922	17.00	510	833	1422	1755
	3′ 10″	12.75	1009	17.66	530	865	1539	1874
	4′ 2″	13.89	1099	18.34	550	899	1649	1998
	4′ 6″	14.99	1186	19.00	570	931	1756	2117
	4′ 10″	16.08	1272	19.66	590	963	1862	2235
	5′ 2″	17.22	1362	20.34	610	997	1972	2359
	5′ 6″	18.32	1449	21.00	630	1029	2079	2478
	5′ 10″	19.41	1535	21.66	650	1061	2185	2596
	6′ 2″	20.55	1626	22.34	670	1095	2296	2721
	6′ 6″	21.65	1713	23.00	690	1127	2403	2840
3′ 8″	3′ 6″	12.85	1016	18.00	540	882	1556	1898
	3′ 10″	14.06	1112	18.66	560	914	1672	2026
	4′ 2″	15.30	1210	19.34	580	948	1790	2158
	4′ 6″	16.52	1307	20.00	600	980	1907	2287
	4′ 10″	17.73	1402	20.66	620	1012	2022	2414
	5′ 2″	18.97	1501	21.34	640	1046	2141	2547
	5′ 6″	20.19	1597	22.00	660	1078	2257	2675
	5′ 10″	21.40	1693	22.66	680	1110	2373	2803
	6′ 2″	22.64	1791	23.34	700	1144	2491	2935
	6′ 6″	23.86	1887	24.00	720	1176	2607	3063
4′ 0″	3′ 6″	14.00	1107	19.00	570	931	1677	2038
	3′ 10″	15.32	1212	19.66	590	963	1802	2175
	4′ 2″	16.68	1319	20.34	610	997	1929	2316
	4′ 6″	18.00	1424	21.00	630	1029	2054	2453
	4′ 10″	19.32	1528	21.66	650	1061	2178	2589
	5′ 2″	20.68	1636	22.34	670	1095	2306	2731
	5′ 6″	22.00	1740	23.00	690	1127	2430	2867
	5′ 10″	23.32	1845	23.66	710	1159	2555	3004
	6′ 2″	24.68	1952	24.34	730	1193	2682	3147
	6′ 6″	26.00	2057	25.00	750	1225	2807	3282
4′ 4″	4′ 6″	19.49	1542	22.00	660	1078	2202	2620
	5′ 2″	22.39	1771	23.34	700	1144	2471	2915
	5′ 10″	25.24	1996	24.66	740	1208	2736	3204
	6′ 6″	28.15	2227	26.00	780	1274	3007	3501

Pilot Light Warns of Fire Hazard

Possible serious property loss and interruptions in business operations are prevented through the installation of a basic device which avoids overheating of ducts that are part of a high velocity air system.

THROUGH a simple pilot light installation, a possible fire hazard due to overheating of ducts serving the air conditioning, ventilating and heating system in the 45-story Socony Mobil Building, New York City, was eliminated.

This building, one of the new major office buildings in this city, essentially consists of a 31-story tower building placed on top of a 14-story building one block in area. Each of the lower floors has an area of 2 acres while each upper tower floor has an area just under one-half acre. Use of high velocity air distribution for the interior zone, reduced duct and shaft sizes as compared to a conventional system.

Figure 1 shows a typical strip heater installation as used in the high velocity air system in this building. Recently, a condition developed due to the malfunctioning of an air flow switch, at the time that the room thermostat was calling for heat, that emphasized a potential fire hazard. The strip heater remained on after the system was shut down, because the air flow switch did not function as it should. Since there was no appreciable air flow, excessive temperatures developed around the heater which could have reached the danger point, if this condition were not discovered in time.

A pilot light is now installed so that it just barely extends through the acoustic ceiling block, and this light is connected through an electrical circuit with the pneumatic electric switch shown in the illustration.

This light goes on whenever the strip heater is operating. When the HVAC system is shut down at night, then since there is no strong air flow through the duct, there is a loss in static pressure, the air flow switch opens the strip heater circuit, and the pilot light goes out. The Security Department of this building has been instructed to watch for illuminated pilot lights and to report the location of such lights to the watch engineer who will proceed to secure the electric circuit feeding that particular unit. This type installation avoids the need for breaking through a ceiling when exploring for the exact location of strip heater circuit trouble.

Electrical Circuit

Installation of this device is simple. The pilot light is tied in parallel with the strip heater by using terminals in the Minneapolis-Honeywell contactor. The voltage across the strip heater is 265 volts. A small neon light (110 to 600 volts) is used and the asbestos covered wire is run through ½ inch thin wall electrical conduit (EMT). The pilot light is enclosed in a deep handy box, so placed that the handy box plate holding the light terminates ⅛ inch from the inner top side of the acoustic block. The small neon lamp barely protrudes through the acoustic ceiling.

This type installation is most important from an operating standpoint for all of the controls are located in a concealed space above the acoustic ceiling.

The development of this type installation is due jointly to A. Smith, chief electrician, and John Walls, elevator mechanic, both of the building staff.

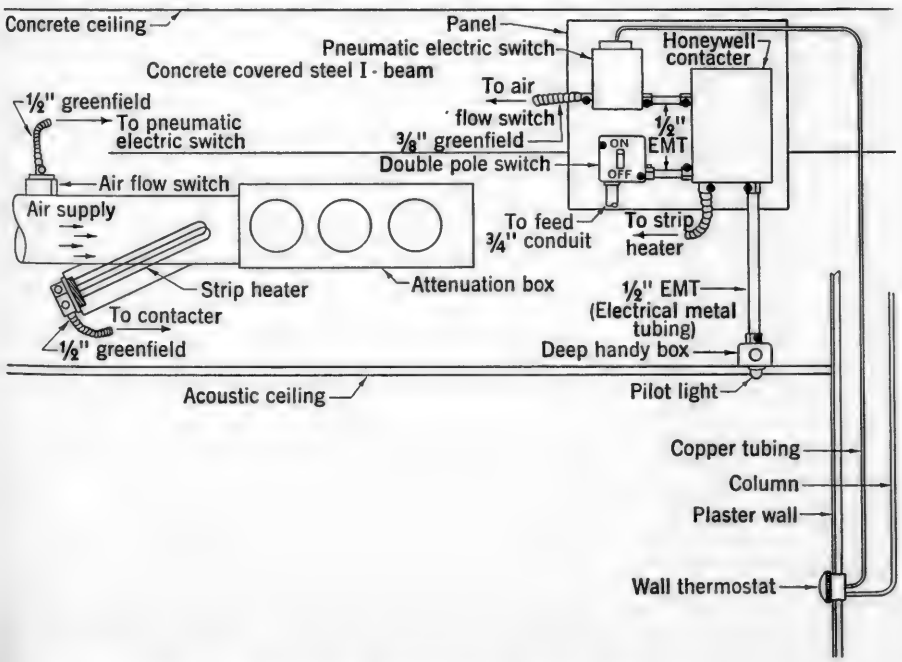


Fig. 1. Typical installation of strip heater in high velocity air system, showing pilot light connection.

Model Studies of Flue Design

save money for industry through:

(1) decrease in pressure drop
(2) lower construction costs
(3) increased precipitator capacity

AMERICAN industry is keenly aware of the problem of air pollution and spends hundreds of millions of dollars per year to reduce pollution. Many types of equipment are used from mechanical collectors through cyclone-type collectors to high efficiency electrostatic precipitators. While mechanical collectors remove larger and heavier particles from industrial gases, electrostatic precipitation is required to remove particles of small size from 0.1 to 40 microns.

Research-Cottrell, Inc., Bound Brook, N. J., has operated an electrical laboratory and research department since the discovery of electrostatic precipitation as a useful commercial process 50 years ago. Refinements in electrical precipitation have been made constantly by laboratory work, pilot plant studies, and field testing until today precipitation efficiency of over 90% are common and a few have reached 99.9%.

However, precipitators have always been sold on a "flange to flange" basis. In fact all parts of a power plant are purchased as separate units. The precipitator manufacturer usually submits a bid on the precipitator only. He does not design the flues leading to and from the precipitator and has no authority and only limited influence on flue design. In some cases he is shown the flue design and designs the precipitator large enough to make up for turbulent flow of gas into the precipitator.

Neither does the precipitator manufacturer have any say in the design of major equipment directly preceding or succeeding the precipitator. Inasmuch as each manufacturer wants to take up as little space as possible and submit the lowest possible bid, short ducts and sharp, right angle turns are the rule.

The company believes that improved flue design will save money for industry. It was also felt that the best way to study flue design was by means of scaled working models so that gas flow patterns could be studied and velocity and pressure profiles could be obtained. Transparent plastic models were selected because of the ease of working, visibility of smoke through the plastic, and ease of making changes in the models.

A model can be built in 6 to 8 weeks after preliminary drawings have been prepared. An engineer in the company's model shop scales the drawings down to 1/16 the size of the commercial size, or ¾ inch equals one foot. Four technicians cut the parts from 3/16-inch Plexiglas sheets using woodworking power tools such as a saw, sander, joiner and drill press.

Two test engineers study flow patterns by means of threads, ribbons, ground cork, or dust, although most flow pattern studies are made with smoke. Anemometers and pitot tubes are used to take velocity and pressure measurements.

Studies of costs of the models built to date indicate that the costs are nominal in comparison to the benefits which can accrue from such studies. Two years of flue design in the study of working models has indicated several areas in which dollar savings to industry can be achieved.

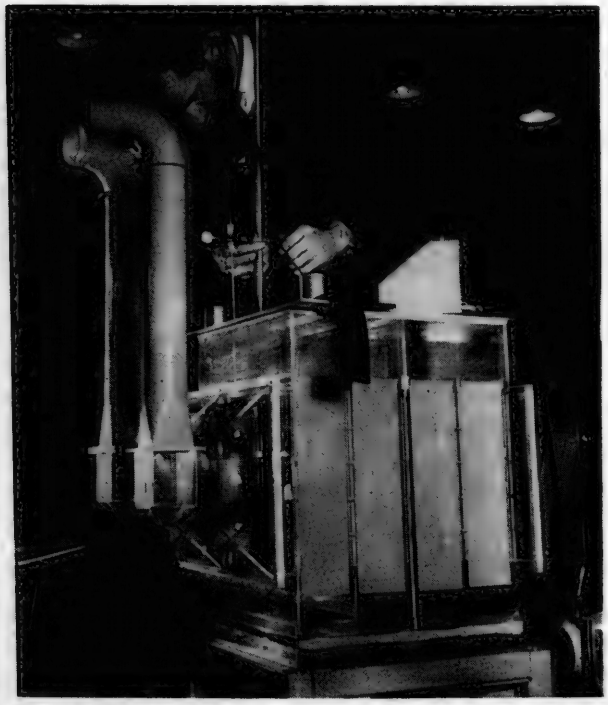


Fig. 1. Effect of variation in placement of perforated plates on gas flow through model precipitator is determined by a velocity traverse across the plates.

Decrease in Pressure Drop

The greater the pressure drop through the flues, the larger the fan and motor must be to force or induce gas through the system. Industry estimates that a pressure drop has an approximate dollar equivalent. Measured in terms of inches of water, each inch (w.g.) can be capitalized at from $40,000 to $80,000. It has been shown by models that it is possible to design flues to reduce pressure loss from ¼ to over 1 inch (w.g.).

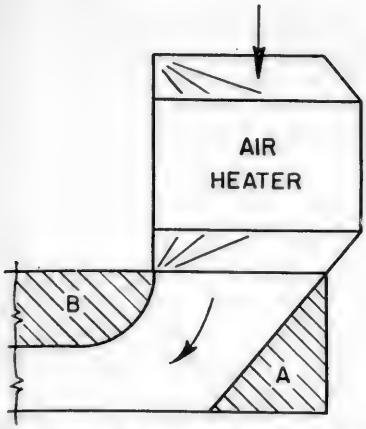


Fig. 2. Lined areas indicate conventional design to which air heater gas outlet turn was first built.

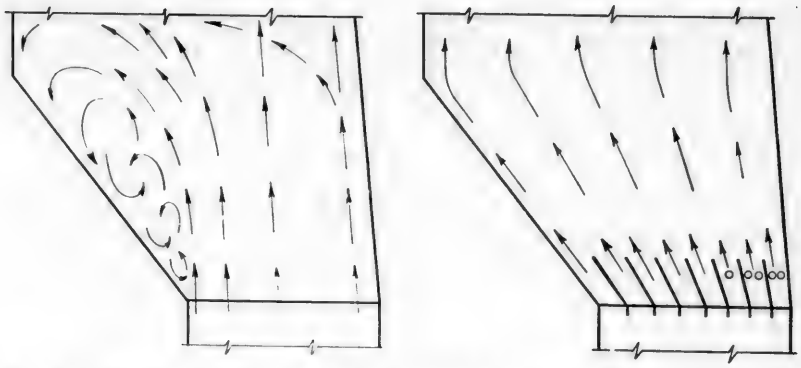


Fig. 3. Left of two sketches shows turbulence in horizontal flue connecting the turn of Fig. 2 to mechanical collector. Sketch at right shows how vanes and round posts were used to equalize flow and reduce turbulence.

Increasing Capacity of Precipitators

By bringing the gas to be cleaned to the precipitator in a more uniform manner, without turbulence and evenly distributed over all the plates, two approaches to precipitator design are possible.

1. Smaller precipitators can be used to attain a given efficiency.

2. A larger volume of gas can be treated in a precipitator of given size. In addition, the extra plate capacity design into precipitators in the past because gas flow was erratic, is no longer required. The capacity "safety factor" is no longer needed.

Lower Construction Costs

Model studies have shown that certain components can often be eliminated or their function replaced by less costly devices. For example, by correctly designing a flue, drop-out hoppers can often be eliminated. Model studies showed that the hoppers increased turbulence and pressure drop. Gas currents entered the hopper and stirred up as much dust as it trapped. Dust build-up could be prevented by soot-blowers. The material previously needed for hoppers and the labor of construction were eliminated.

Savings in Precipitator Design

Although not properly a part of the flue design study, improvements in precipitator design have already been made. Certain baffles in the precipitator itself formerly used to correct gas flow are now unnecessary, thereby lowering cost and pressure drop.

Flue Design for a Fixed Plant Layout

A model was built to determine the best design of a flue between the air heater and the mechanical collector preceding the electrostatic precipitator in a large power generation station near New York City. The position of the air heater and the mechanical collector were fixed by the plant layout. The problem was one of conducting the gas from the air heater to the mechanical collector with the lowest possible pressure drop in a prescribed distance.

The model was first built according to conventional design as shown in Fig. 2. Considerable turbulence was observed in the areas *A* and *B*. The first change was to eliminate the space shown as area *A* by sloping the wall of the flue to conform to the angle of the transition from the air heater. Flow separation and turbulence were eliminated in this area.

It was found that considerable turbulence and even reverse gas patterns existed in area *B*. Velocity profiles showed negative readings. As indicated in the sketch, the turn was rounded and the cross section was reduced, thereby eliminating this condition.

With an improved flow pattern at the air heater gas

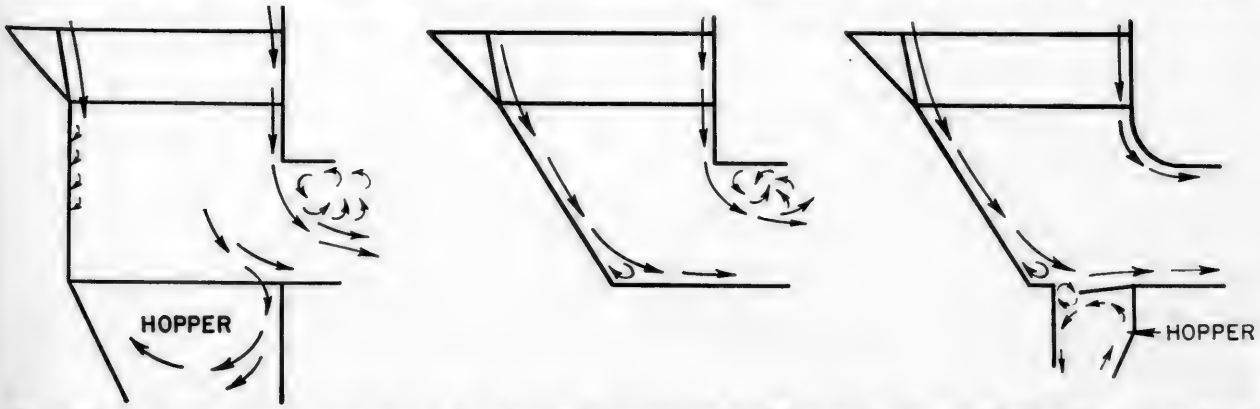


Fig. 4. Three sketches show progressive design changes in model study of flue section coming from air heater, and preceding 145-deg turn leading to mechanical collector.

outlet turn, attention was then given to the horizontal flue connecting the turn to the mechanical collector. The problem was one of reducing pressure drop by obtaining uniform flow. As shown in Fig. 3, vanes were used to equalize flow. Round posts were placed between the vanes on one side (see sketch at right in Fig. 3) to equalize the pressure drop through the vanes and to provide uniform flow.

The changes in the flue resulted in a decrease in pressure drop, as evidenced by a reduction in turbulence. Of the revisions made, the rounding of the flue (area *B* in Fig. 2) had the greatest effect.

Quantitative Results from a Test Model

A very recent test for a public utility illustrates what can be accomplished in reducing pressure drop by changing the design of the flue preceding the electrostatic precipitator. The model was built to accepted, conventional design. Gas enters at the top of the flue, passes through the round air heater, passes over a wash-down hopper, makes a 145 deg turn into the flue to the mechanical collector. The gas enters the electrostatic precipitator after the mechanical collector.

Sketch at left in Fig. 4 shows the behavior of the gas (with the conventional design) after it leaves the air heater. Smoke tests (indicated by small arrows) showed considerable turbulence because of the right angle turns, and because of the open hopper.

The first change in the model is shown in the middle drawing. The hopper was removed during this test and the left side of the flue was changed from straight to sloping. Less turbulence was noted. The pressure drop was reduced by 15%.

However, an air heater wash-down hopper was required to collect water used in cleaning the air heater. It was agreed with the customer that this hopper was not intended to collect dust. The flue was changed as shown in the sketch at right in Fig. 4. The turn was rounded and a partially covered wash-down hopper was built retaining the sloping left side of the flue. By experimenting with the design and position of the hopper, the point of minimum hopper circulation was established. The effect of this hopper on overall turbulence and pressure drop was negligible. The pressure drop with the flue as shown in the sketch at right was reduced by an additional 25% or a total decrease from the original design of 40%.

The economic advantage of the final design is considerable. As mentioned previously, industry considers that each inch pressure drop is equal to a capitalized investment of $40,000 to $80,000. These are savings derived from using a smaller fan, a smaller fan motor and less power over the life of the installation to drive the fan. This does not take into account improved efficiency and decreased cost of maintenance of the mechanical collector and electrostatic precipitator because of more even flow and less turbulence.

Experience indicates that shock flow patterns correlate well and are the same in both models and a commercial sized unit. However, it is difficult to quantitatively correlate model study pressure drop to full size conditions because the model does not operate at full size Reynold's number. The pressure loss due to surface frictional effects is not known. Therefore, the decrease in pressure drop as indicated by the model study should not be translated directly into a dollar figure.

Year-Round Air Conditioning Achieved with HTW

New York International Airport (Idlewild) is the first civilian facility to attempt a large scale installation of high temperature water heating. It is also unique in its use of HTW to produce chilled water in quantity for air conditioning. Both chilled and HTW are produced in a central plant. Its nine lithium bromide absorption machines were specially designed by Carrier engineers after discussions with the engineers of the Port of New York Authority headed by Charles Broder, the Authority's mechanical engineer. These machines normally use low-pressure steam.

The chilled water lines parallel the HTW lines from the central plant to serve the various terminal buildings. Only closed cooling coils are used for air conditioning to prevent contamination of the water.

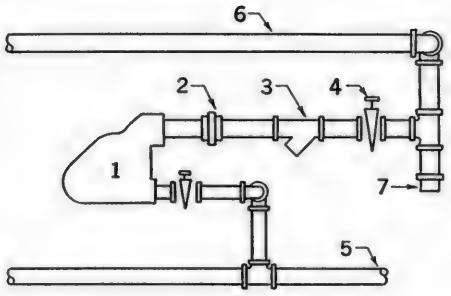
Four forced circulation HTW generators can produce 160,000,000 Btu per hr to supply 380 deg F water with 240-deg return. Pump capacity for the HTW system is 1,140,000 lb per hr at 160-ft head. The nine refrigeration machines, rated at 700 tons each, produce 45-deg water designed for a 10-deg rise. Pump capacity for the chilled water system is 16,800 gpm at 150-ft head.

All six miles of HTW lines, ranging from 4 to 10 inches dia, are insulated with natural asphalt. Four miles of 5 to 20-inch dia underground chilled water piping is insulated with 1-inch polystyrene, coated with an exterior wrapping and asphalt. Because ground water levels in the area are unstable, all pipe is anchored to concrete pads.

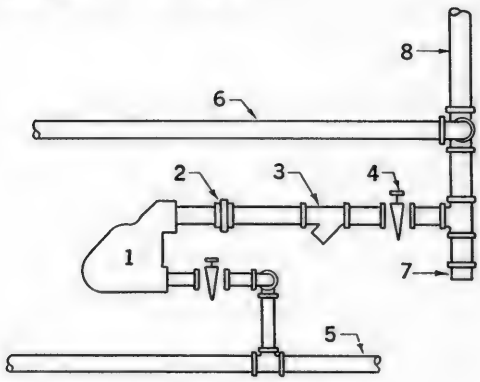
Condenser water from the absorption machines flows to two cooling towers, designed to cool 24,600 gpm from 103 to 85 deg when outside air is 78 deg w.b. The induced-draft towers pull 455,000 cfm against a static pressure of 0.65 inches water gage.

Several advantages are advanced for selection of a central plant, which is located on the perimeter of the airport. First, the construction, operation, and maintenance of separate facilities in each of the many buildings are eliminated. Secondly, a lot of valuable space for airline operations is saved. Cleanliness of the general area is also achieved. However, several economic factors, including the large size and long length of piping required, have to be weighed in the balance, so that the decision arrived at Idlewild need not be the right one for all large airports. An extensive survey by the Port of New York Authority engineers preceded their selection of a high temperature water system for the airport.

STEAM PIPING CONNECTIONS



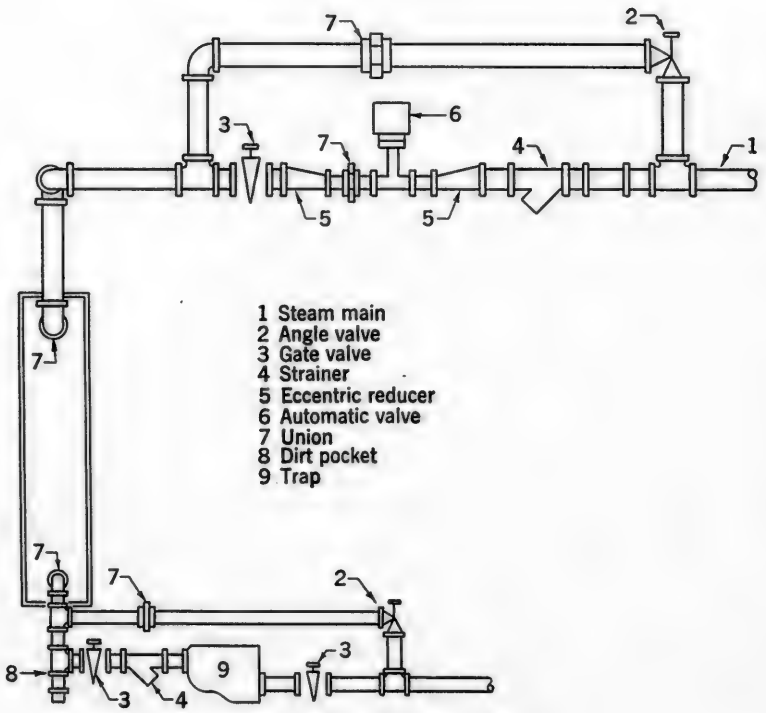
At end of steam main



At base of steam riser

1 Float and thermostatic trap
2 Union
3 Strainer
4 Gate valve
5 Condensate return main
6 Steam main
7 Dirt pocket
8 Steam riser

DETAIL OF DRIP CONNECTIONS



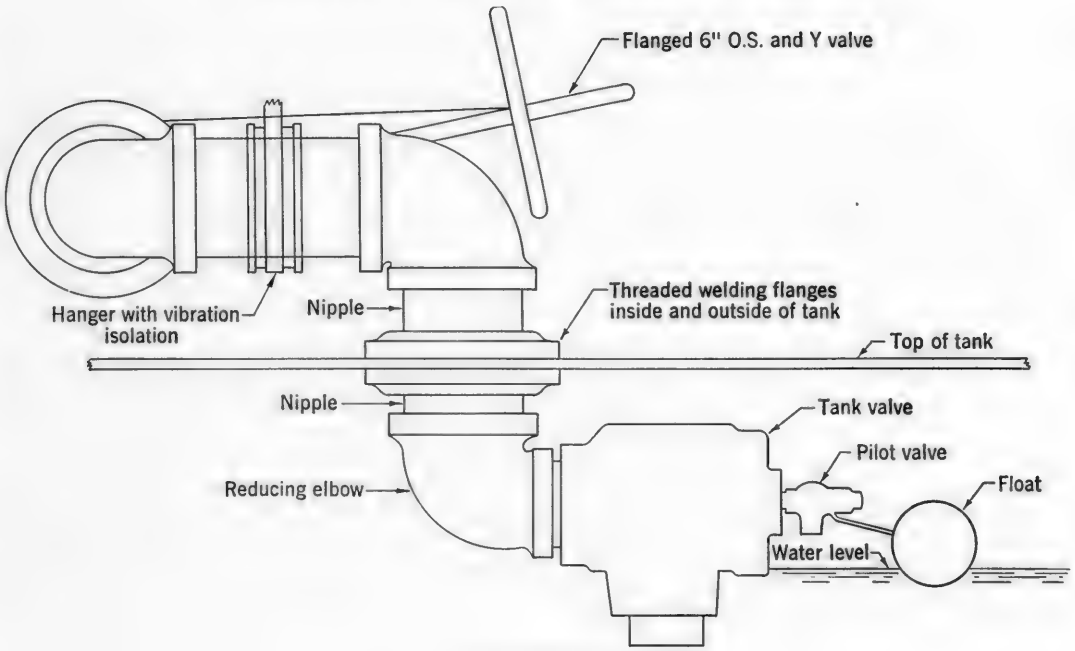
1 Steam main
2 Angle valve
3 Gate valve
4 Strainer
5 Eccentric reducer
6 Automatic valve
7 Union
8 Dirt pocket
9 Trap

STEAM PIPING CONNECTIONS TO COIL

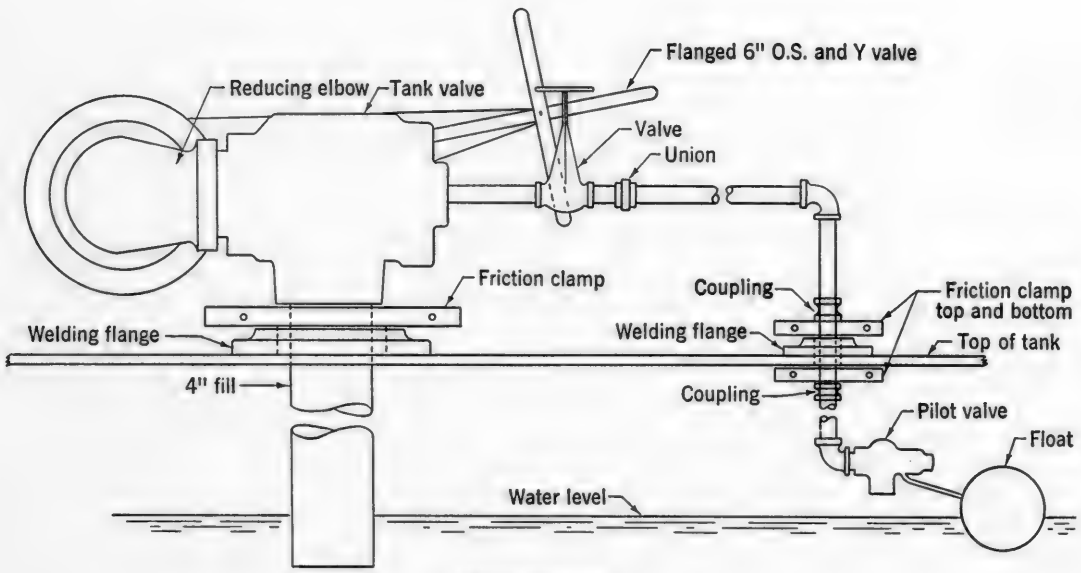
Drawing courtesy of Lazenby & Borum, Atlanta, Ga.

PILOT OPERATED FLOAT VALVE

CONNECTIONS FROM TANK TO VALVE



ARRANGEMENT 1



ARRANGEMENT 2

Drawing courtesy of George R. Jerus, of Meyer, Strong & Jones, New York, N. Y.

Evaporative Cooling Safeguards Potatoes in Storage

R. S. ASH
International Metal Products Co., Phoenix, Ariz.

Potatoes are both an important storage commodity and an important food. In 1956, potato production totaled 243,238,000 hundredweight. In many states potatoes are grown in such immense quantities that they cannot be marketed as soon as dug except at prices that would be ruinous to growers. It is estimated that a month's supply of potatoes is about 30 million bushels. The average late summer and fall production is about 300 million bushels. This means that the potatoes harvested from late August through November represent about a 10-month supply. Obviously, this must be stored — a large part of it for as long as six to eight months. This article covers the use of evaporative cooling for potato storage.

Fig. 1. Building which provides bank type storage. Photograph, courtesy of Long Island Produce and Fertilizer Company.

THE potato storage period is divided into two parts: the wound-healing or curing period and the holding period. The wound-healing period immediately follows harvest. During this time the bruises and other wounds caused during the harvesting operation heal over, and a corky suberin (waxy) layer forms and reduces the danger of rot. The second stage of storage management is the holding period. In general, the higher the temperature maintained during this storage period, the higher the quality of the tubers. On the other hand, the higher the storage temperature, the shorter the period that the tubers can be kept without sprouting and excessive shrinkage. Table I gives maximum holding periods for various storage temperatures.

At 35-40 deg potatoes keep best; at 30-35 deg potatoes turn sweet; below 30 deg potatoes freeze.

The proper management of storage means the controlling of temperature, humidity and air circulation so that the stored tubers will retain their maximum food value with a minimum of loss from rot, shrinkage and sprouting.

The potato takes in oxygen and gives off carbon dioxide and heat, a respiration process basically the same as that of animals. The potato should, therefore, be considered as a living organism, with life processes continually taking place in its tissues. High storage temperatures result in high rates of respiration. Potatoes may give off as much as 175 Btu per hundredweight each 24 hours when stored at high temperatures. Lower storage temperatures result in as little as 20 Btu. Temperature of long term storage should be approximately 38 degrees. A lower temperature causes the starch to turn to sugar, while a higher temperature results in excessive shrinkage through accelerated respiration and transpiration.

Therefore, humidity of the air immediately around the potatoes should be as high as possible. In practice, 85 to 90% relative humidity should be maintained. In the fall at harvest time, large volumes of cool air should be drawn through the storage to bring the potatoes to proper storage temperature. After a temperature of 38 to 40 degrees is reached cool moist air is needed to prevent the temperature from rising above that point and to minimize shrinkage. During winter when cooling is not needed, proper air circulation is still required to maintain uniform temperature and humidity. This prevents freezing near the walls and sprouting or spoilage by a too high temperature at the bin center.

Evaporative Cooling is Feasible

Although refrigerated storage is suitable, the high initial and operating costs make it economically impractical. Common storage structures through the use of

TABLE I—SPROUTING TIME

Storage Temp. Deg F	Elapsed Storage Days Before Potatoes Sprout
55-60	70
50-55	89
45-50	126
40-45	200

the simple principle of evaporative cooling, a form of air conditioning based upon the evaporation of water, can be used quite successfully for the storage of potatoes. High humidity, satisfactory temperature and fresh air to provide adequate oxygen for respiration can be achieved. Evaporative cooling involves what is known as an adiabatic exchange of heat. The sensible heat of the air is reduced proportionally to the amount of evaporation that takes place. The water assumes the wet bulb temperature of the air and cooling proceeds with the enthalpy or total heat content of the air remaining essentially constant. Humidification occurs as a result of the vapor pressure of the water being higher than the partial pressure of the moisture in the entering air. In the process the dew point temperature rises and the dry bulb temperature falls with the wet bulb temperature remaining constant. The maximum possible dry bulb temperature reduction is the difference between the entering air dry bulb and wet bulb temperatures and this is usually referred to as the wet bulb depression. If it were possible to cool the air an amount equal to the wet bulb depression, the air would be completely saturated. Since this is not the case in actual practice, evaporative cooling systems operate at something less than 100% humidifying effectiveness.

In this connection, the air temperature resulting from the evaporative cooling process should never be considered as the temperature of the storage for the latter will be several degrees higher. The temperature difference is usually called the diffusion temperature and it

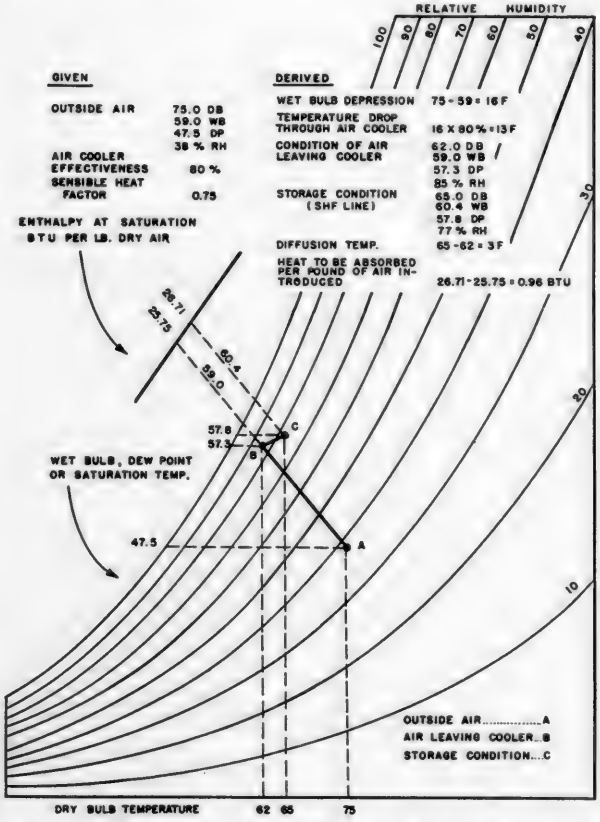


Fig. 2. Psychrometric chart on which is illustrated a typical evaporative cooling problem. Example is characteristic of a potato storage house.

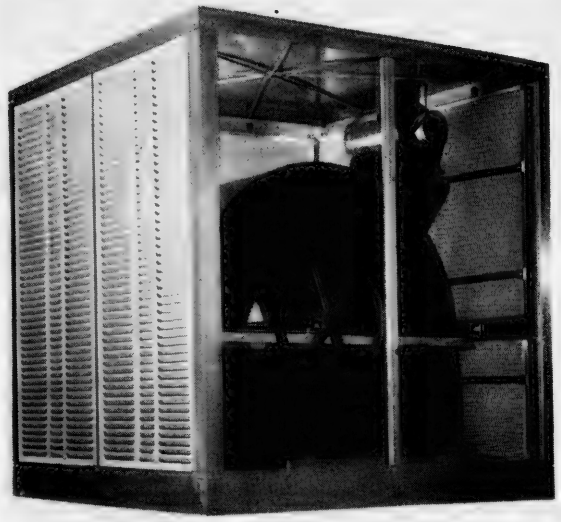


Fig. 3. Package type air cooler.

depends upon the heat load imposed by the potatoes, the heat transmitted from the outside through the walls and roof of the potato house and the amount of cool air discharged.

Figure 2 is a skeleton psychrometric chart on which is illustrated a typical evaporative cooling problem involving a heat load that has a 25% latent heat component. This example is characteristic of a potato storage house during the early fall when it is desirable to keep a potato temperature of about 60 deg. to encourage wound healing.

Package Air Cooler

In commercial practice the principle of evaporative cooling is utilized through the installation in the potato house of a package air cooler. It is placed in very much the same fashion (and at about the same cost) as the centrifugal fan for a forced air duct type ventilation system.

A package air cooler, Fig. 3, consists of a sheet metal cabinet with louvered sides containing saturation media. Within the cabinet is a centrifugal fan for drawing air through these saturation pads. Water circulated to the pads is evaporated and the incoming air is cooled. A properly sized and installed evaporative cooling system will reduce the potato storage temperature as much as 10 to 15 deg. below outside temperature during the fall days and hold the relative humidity at 85-90%. This means that it is possible to maintain about the same temperature and humidity on a 24-hour basis as that possible only at night with a forced air ventilating system.

Using the New Jersey, Long Island and south-eastern Pennsylvania area as a case in point, the normal daily maximum temperature for early September is 75 deg. dry bulb and 59 deg. wet bulb. The normal daily minimum temperature for this time of year is 55 deg. dry bulb and 52 deg. wet bulb. With forced air ventilation, 70 deg. is about the best mean temperature that can be achieved, whereas, an evaporative cooling system can hold the temperature to a mean of not more than 60 deg. with a 85-90% relative humidity. Furthermore, periods of unseasonably warm weather in the storage season that would make ventilation undesirable have little effect on

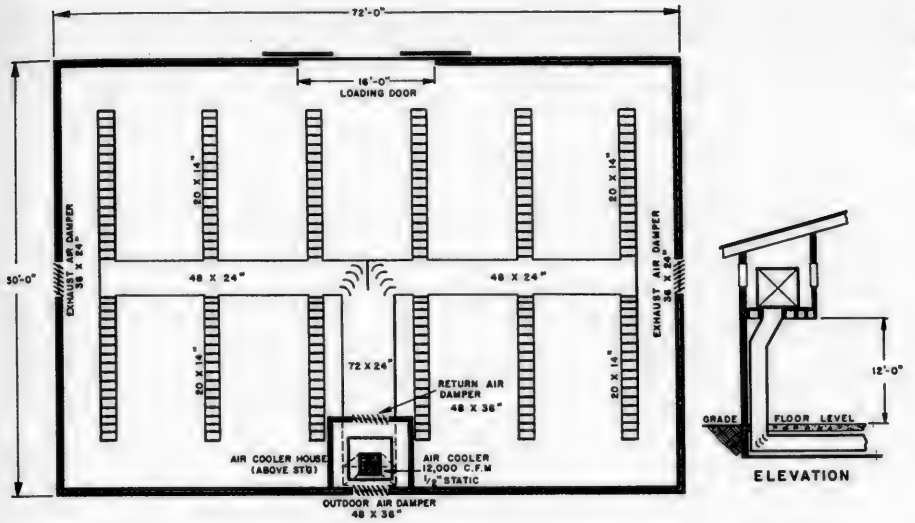


Fig. 4. Floor plan of a typical potato storage house designed so that potatoes can be piled to a maximum 10 ft depth.

storage temperature when evaporative cooling is used as the wet bulb temperature fluctuates to a much lesser extent than the dry bulb temperature.

To sum up, evaporative cooling improves potato storage for six basic reasons:

1. Lowers late summer and early fall temperatures 10 to 15 deg.
2. Improves humidity conditions
3. Eliminates carbon dioxide and other volatile gases from storage
4. Minimizes effect of unseasonably warm weather
5. Slows down blight rot, net necrosis and other potato diseases
6. Reduces rate of respiration and shrinkage of potato

Through-Cooling

Evaporative cooling systems for potato storage houses should be designed for through-cooling with the air passing directly through and in contact with the potato pile. Capacity of cooling system should be based on a three-minute air change to give quick and even cooling. The total volume of the storage should be considered in calculating the size of the system so as to provide sufficient cooling if the depth of storage is increased at a future time. Above floor ducts can be used but under floor ducts are to be preferred as they can also be used for the handling of the potatoes with bin loaders. The ducts should be 20 inches wide and at least 14 inches deep to allow room for the insertion of the bin loader conveyors. Duct tops must be removable and of 3 x 8-inch lumber to support a loaded truck. Boards should be spaced to give ½ inch slots. Distributing and delivery ducts act as extended plenums so it is not necessary to reduce duct depth as the far end of the ducts is approached. Delivery ducts should extend to within 6 ft. of the walls to provide uniform air flow through the storage. Since friction loss in the duct system is negligible, the resistance of the potato pile is the principal load on the fan in the air cooler.

This resistance is approximately 0.25 inch static pressure (potato storage should not exceed 12 ft in depth). The additional resistance of the ducts, inlets, dampers and air cooler pads will add another 0.25 inch or a total of 0.50 inch that the fan must overcome. In large storages, it may be advisable to divide the house into two sections to keep the cooling system within practical limits. A single system should not handle over 12,000 cfm of air if main and distributing ducts are to be of reasonable size.

Steps in Design

To size and layout the evaporative cooling system, the following steps should be followed:

1. Determine air capacity by dividing cubical contents of storage volume by 3
2. Layout duct system with all delivery ducts of equal length and spaced on 12-foot centers
3. Size outside air, exhaust air and return air dampers for 1000 fpm velocity
4. Size main duct for 1000 fpm velocity
5. Size distributing ducts for 750 fpm velocity
6. Size delivery ducts for 500 fpm velocity

Figure 4 shows the floor plan of a typical potato storage house designed so potatoes can be piled to a maximum depth of 10 ft. Evaporative cooling system has been sized and laid out according to the preceding method.

Step 1 Air capacity of system is $\frac{50 \times 72 \times 10}{3}$ or 12000 cfm

Step 2 Duct system is laid out with delivery ducts of equal length and on 12 foot centers

Step 3 Size of outside air, exhaust air and return air dampers is $\frac{12000}{1000}$ or 12 sq ft each

Step 4 Main duct cross sectional area is $\frac{12000}{1000}$ or 12 sq ft which is equal to 72-inch x 24-inch duct

Step 5 Distributing duct cross sectional area is $\frac{6000}{750}$ or 8 sq ft which is equal to a

48-inch x 25-inch duct. There are two distributing ducts so the 12000 cfm air capacity is halved

Step 6 Delivery duct cross sectional area is $\frac{1000}{500}$

or 2 sq ft which is equal to a 20-inch x 14-inch duct. There are twelve distributing ducts so 12000 cfm air capacity is diveded by 12.

The evaporative cooling system for a potato storage house should be designed so that it is possible (1) to supply all outside air, (2) recirculate storage air and (3) circulate a mixture of outside and storage air. The setting of the dampers depends upon the outside and inside temperatures as well as the time of year. All outside air is normally used during the cooling period. As an example, assume that the desired temperature within the storage is to be 40 deg. The system should operate on 100% outside air if the temperature of the air discharged from the air cooler is as cool or cooler than the inside of the storage and the storage temperature is not lower than 40 degrees. Should the temperature of the air discharged from the cooler become warmer than the air inside of the storage, the air within the house should be recirculated. If the outside air drops below 40 degrees some outside and some storage air should be circulated. During the winter months the air should be recirculated. Continuous recirculation is not necessary and the air cooler may be put on time switch operation to run intermittently 10 to 15 minutes out of every hour. The setting of the outside air, return air and exhaust air dampers may be done manually or by automatic controls. If the latter, either simple two-position controls or proportioning controls can be incorporated in the cooling system.

Evaporative cooling may also be applied to the common storage of other vegetables and fruits such as apples. It gives the farmer an effective yet inexpensive means of holding fresh produce. Its function is not to stop the plant life processes but to reduce the rate at which they take place. In addition, evaporative cooling provides air circulation to maintain uniform temperature within the storage, humidity to prevent wilting and shrinkage, and ventilation to remove the volatile gases that may hasten the ripening process.

Protection of Steel in Salt Water

The National Bureau of Standards has completed a study of the electric potential needed to protect steel cathodically from corrosion in salt water. Data obtained under controlled laboratory conditions are expected to provide a basis for handling similar problems encountered under marine conditions. It was found that the best degree of protection was achieved when the specimens were held at minus 0.77 volt with reference to a saturated calomel electrode.

Normal corrosion of iron and steel is an electrochemical phenomenon. When metal is exposed to salt water, differences in electric potential develop at the surface of the metal, resulting in the formation of numerous small corrosion cells. This action causes destructive alteration of areas, known as anodes, on the metal surface where metallic ions enter the electrolyte. In applying cathodic protection, direct current from an external source is caused to flow from an auxiliary anode toward the corroding surface. This prevents positive metal ions from entering the electrolyte.

The potential at which a metal structure should be maintained in order to prevent corrosion is a question of practical interest. Insufficient negative potential will give inadequate protection. On the other hand, maintaining a greater potential than is needed is unnecessarily costly. Some engineers are of the opinion that —0.85 volt with reference to a copper-copper sulphate electrode (equivalent to —0.77 volt with reference to a saturated calomel electrode) sometimes represents overprotection and excessive current demands. It was to study this problem that W. J. Schwerdtfeger of the Bureau's corrosion laboratory undertook the present work.

An earlier laboratory investigation of corrosion in various types of soils using soil cells had shown that steel specimens maintained at —0.77 volt with reference to a saturated calomel electrode lost negligible weight in a 60-day exposure period. Also, deviations in potential electro-positive to this voltage for relatively short intervals resulted in appreciable weight loss. Specimens maintained at more negative potentials (—1.0 volt) generally showed no greater reduction in weight loss.

The corrosive environment chosen for the present study was Washington, D.C. tap water with an added 3% by weight of sodium chloride. This electrolyte presented no problem in the measurement of significant potentials; no special equipment was needed as the IR (voltage) drops in the salt water were negligible. All specimens were 16-inch long, 0.5-inch diameter, cold-rolled steel rods, taped at the water line, and suspended vertically in the water for 60 days.

Currents and potentials were measured with both recording- and indicating-type instruments. Protective potentials were controlled to within ± 5 mv by an electronic balancing unit which actuated a motor-driven voltage divider that applied current to the specimens. Currents required to maintain these potentials were compared with the currents indicated by changes-in-slopes, referred to as "breaks," of cathodic polarization curves obtained on control specimens. The polarization curves were obtained automatically by using a synchronously driven voltage divider and a two-pen (current and potential) recorder.

Under both stagnant and aerated exposure conditions, the best degree of cathodic protection was attained at —0.77 volt with reference to a saturated calomel electrode. Although a good but lesser degree of protection was noted at potentials more noble than —0.77 volt, this degree of protection could not be obtained at lower current densities. Therefore, —0.77 volt was considered to be the optimum protective potential.

AIR CONDITIONING, HEATING and VENTILATING'S

REFERENCE SECTION

JUNE, 1958

Controlling Ventilation Noises

A method and work sheet for predicting and reducing fan noise, from a report by Armour Research Foundation, prepared for DeBothezat Fans Division of American Machine and Metals, Inc.

Controlling Ventilation Noises

Information on how to predict and reduce fan noises; data on fan noise ratings and application of data to ventilation and air conditioning problems. The information presented here is abstracted from a report resulting from research done for DeBothezat Fans, a division of American Machine and Metals, Inc., East Moline, Ill., by the acoustics staff of Armour Research Foundation of Illinois Institute of Technology. Reproduced by permission.

ONE of the problems in fan selection is the noise acceptability of the fan in its particular installation. This report has been prepared to enable ventilating engineers to determine the noise which will be produced in a given situation. A work sheet and explanation of its use is given so that the ventilating engineer can follow the procedure quantitatively as well as qualitatively. The methods and procedures described are not rigorous; but they are sufficiently accurate to give a reasonable engineering approximation of the noise level in the room being ventilated.

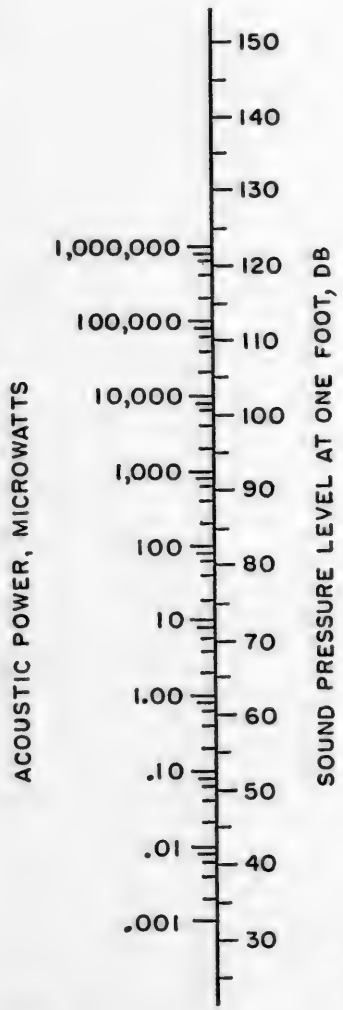


Fig. 1. Acoustic power versus sound pressure level at 1 foot.

Physics of Noise

Some of the basic terminology used in noise control follows:

Sound

The human ear receives fluctuations in air pressure and converts these to nerve impulses which the brain converts to a sensation. Sound, therefore, is nothing more than fluctuations in the normal atmospheric pressure. Fluctuations in the audible range are from a minimum of approximately one-billionth of a pound per square inch to a maximum up to about one-tenth of a pound per square inch, units very inconvenient to use as a measure because of the small size of the numbers and the large difference in maximum and minimum audible levels.

Decibels

A range of numbers easier to work with results when the sound level is given in decibels; which is defined as 20 times the logarithm of a ratio; the sound pressure of the

TABLE I—SOUND PRESSURE LEVEL AND TYPICAL NOISES

Sound Pressure Level, db	Typical Noises
0	Threshold of hearing (acute ears)
20	Whisper at 10 feet, rustle of leaves.
40	Quiet office, ticking clock.
60	Restaurant, automobile
80	Truck passing 20 feet, printing press.
100	Punch press at 5 feet.
120	Airplane at 40 feet, pneumatic drill.
140	Airplane engine on test stand.

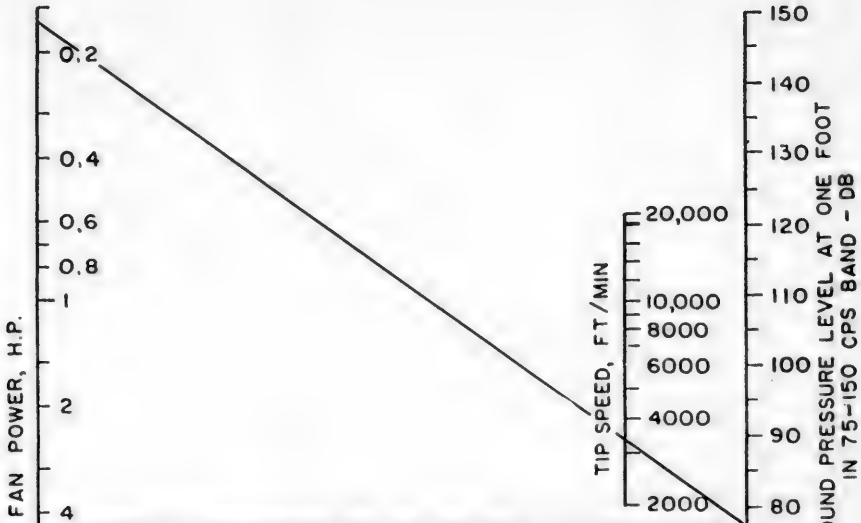


Fig. 2. Sound pressure level at one foot in 75-150 CPS band from fan power and tip speed.

OCTAVE BAND	AMOUNT TO BE SUBTRACTED FROM LEVEL IN 75-150 CPS BAND
75-150	0
150-300	5
300-600	10
600-1200	15
1200-2400	20
2400-4800	25
4800-9600	30

noise divided by the minimum sound pressure which the human ear can hear. A level of zero db is the minimum sound level detectable by the ear and a level of about 130 db is the maximum level which can be heard without producing pain. Table 1 lists sound levels in decibels produced by several common sources, and Fig. 1 shows comparison of absolute sound power of a source in microwatts with decibel ratings at one foot based on threshold = 0.

Frequency

The number of pressure fluctuations per second received by the ear is called frequency. The ear can hear frequencies from 20 cycles per second to approximately 15,000 cycles per second. Most of the sounds produced by fans and other ventilating equipment are in the range from 75 to 10,000 cycles per second. Since the ear is affected differently by low frequencies than it is by high frequencies, it is usually best to describe any noise in terms of its level in sections of the frequency range. The octave band is a frequency spread for which the highest frequency is twice the lowest frequency. The 8 octave bands normally used in noise work are as follows.

Octave Bands
37- 75 cps
75- 150
150- 300
300- 600
600-1200
1200-2400
2400-4800
4800-9600

For this demonstration of fan noise work the 37-75 cps band has been eliminated because the ear is not very sensitive to these low frequencies.

Absorption

When sound energy strikes the walls of a room a portion of the sound is reflected while another portion is absorbed. The part absorbed is converted to heat. The absorption is much greater at high frequencies than at low frequencies. This absorption is equivalent to reducing the amplitude of the sound pressure fluctuation, thereby resulting in a lower noise level.

"Live" and "Dead" Rooms

If many of the surfaces in a room are soft and of a fibrous nature a large portion of the sound energy which strikes them is absorbed giving a high ratio of direct sound from the source to the sound reflected from the walls. Sound produced within the room would be quite directional and would sound "dead" similar to the same sound produced out of doors. In a "live" room, on the other hand, the walls and objects are usually very hard-surfaced and any sound produced within the room will reflect back and forth from the walls. There will be a small ratio of direct to reflected sound. In a dead room the noise produced by a clap of the hands will disappear within a fraction of a second. In a large live room a clap of the hands will be audible for a period sometimes as long as four or five seconds. In an average room a hand clap can be heard less than one second. The liveness or deadness of a room being ventilated is quite important because a sound produced at a distance from an observer in the room will sound louder if the room is live than if it is dead.

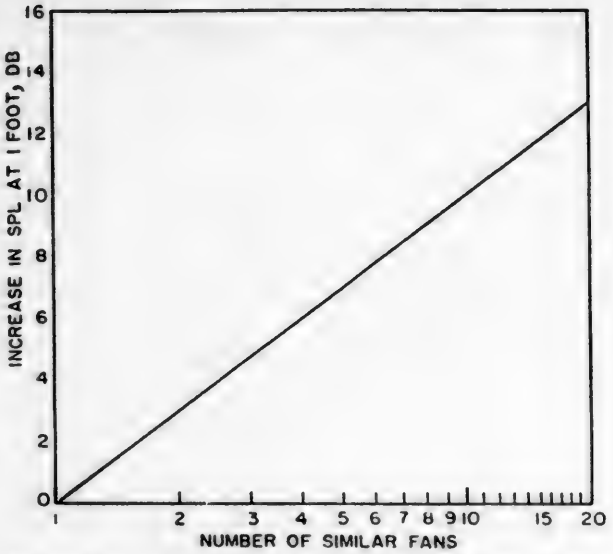


Fig. 3. Increase in sound level produced by using more than one identical fan.

If two rooms have the same amount of absorption per square foot of wall surface the larger of the two rooms will sound liver than the smaller. This is based on Sabine's formula which states that reverberation time (which is a measure of liveness) is equal to 0.05 V divided by A, where V is the room volume in cubic feet and A is the total number of square feet of perfect absorption. Reverberation time increases with room volume.

Noise Rating of Fans

Recently manufacturers have begun to give noise ratings to their various types and sizes of fans. The method demonstrated here uses data compiled at a test facility which allows rating fans for noise on both the inlet and outlet sides in one test set-up. The system utilizing ratings in octave bands is relatively simple yet gives a reasonably complete picture. This type of rating and the approach used here allows computation of expected room noise level with very little complicated mathematics.

Pending cataloging of exact sound ratings, the nomogram, Fig. 2, has been prepared. It is offered to demonstrate the method and allows the purchaser of one specific line of ventilating fans to estimate roughly how much noise will be produced. It includes a table of the number of decibels which must be subtracted from the sound pressure level at one foot in the 75-150 cps band to give the approximate sound pressure level at one foot for the fan in each other octave band. When exact data are available in catalogs they should be used for accurate results, since exact data will be based on the results of actual reverberation room measurements. After octave band ratings have been determined (either in decibels or in microwatts which can be readily converted to decibels at one foot by the use of Fig. 1) the technique described here can be used to estimate the noise level in the room being ventilated.

Users of the method should bear in mind that results will not be valid unless rating data are consistent with those described here. That is:

(1) The decibel scale must be based on the same zero point; i.e., on the threshold of hearing. Conversions from microwatts can be made by using Fig. 1, except as noted under (2).

(2) Microwatts in each band must be shown separately for intake and exhaust side. If a microwatts rating figure is given which represents total sound power emanating in all directions for each octave band, then the use of Fig. 1 to convert to decibels at one foot will be in error. If it so happened in such a case that the sound power divided equally between the intake and exhaust side of the fan, then the decibels at one foot using Fig. 1 would be too high by three decibels. (Three decibels increase represents doubling of sound power).

(3) It should be emphasized that microwatts in each octave band, *not* decibels at one foot, is the basic sound rating. However, converting to the more or less artificial unit, decibels at one foot, *with* the limitations under (2) makes a convenient starting point for solving application problems using this method.

No readings were taken one foot from the fan nor should they be.

(4) Also of importance to point out is that the sound power ratings in microwatts in each octave band need not have been taken on acoustically similar reverberation rooms. The sound power emanating from the fan is a real unchanging quantity and will remain the same in whatever test room the fan is placed. The important thing is not that the reverberant rooms be acoustically similar but that they be acoustically calibrated and non symmetrical and reverberant enough to give uniform sound level meter readings throughout with a minimum of standing waves.

While instrumentation for accurate acoustic calibrating of reverberation rooms may be a pro-

TABLE 2—SOUND CHARACTERISTICS OF ROOM TYPES

Room	Character[1]
Radio and television studios	ML-MD
Concert hall	ML
Homes	MD
School rooms	ML
Music rooms	ML-MD
Lecture halls	ML
Theatres	ML
Churches	L
Hospitals	L-ML
Hotel rooms	MD
Gymnasium	Hard A
Libraries	MD-ML
Art galleries	MD-ML
Offices	ML
Conference rooms	ML
Department stores	MD-ML
Restaurants	L-MD
Factory offices	L-ML
Factories	L-Hard
Building lobbies	M-Hard

[1]Hard=hard-wall rooms without occupants
Hard A=hard-walled rooms with occupants
L=live rooms
ML=medium-live rooms
MD=medium-dead rooms.

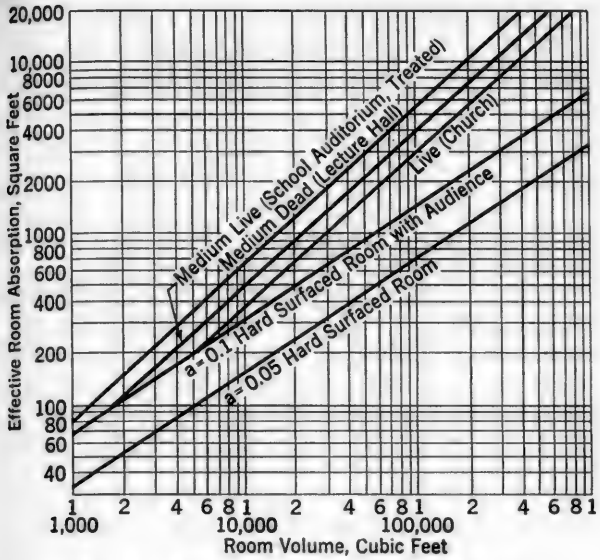


Fig. 4. Effect of room volume on effective room absorption.

hibitive expense for most fan companies, there are laboratories such as Armour Research Riverbank Laboratory available which can perform this service. If a company has one of their fans accurately sound rated in one of these qualified labs, then one test in the company's reverberation room will supply the necessary acoustic calibration data for all other fan tests.

It might be noted that any peaking of sound pressure level in octave bands corresponding to blade frequencies has been considered in the nomogram and data presented here which are based on actual tests of a variety of fans at many different speeds.

If more than one fan is used to ventilate a room the increase in noise produced by multiple identical fans can be found in Fig. 3.

Effect of Room Size

In order to compute the approximate sound pressure level in the room being ventilated, it is necessary to know something about the characteristics of the room itself. There will, naturally, be more noise in most rooms close to the fan or its duct opening than at more distant regions due to sound attenuation with distance. There will also be a difference which depends on the amount of absorption in the room.

First, the volume of the room in cubic feet should be calculated. Then determine which of the room types shown on the sloping lines in Fig. 4 most nearly fits the room conditions. Since this takes a little experience, which perhaps has not been acquired by the average ventilating engineer, Table 2 has been prepared giving an approximate rating for a number of common types of rooms. The liveness of any particular type of room varies considerably; therefore, this table should only be used as a very rough guide and only when the liveness of the room cannot be determined by listening or good judgment.

Table 2 divides rooms into five categories, according to their liveness. The first category is a hard-walled

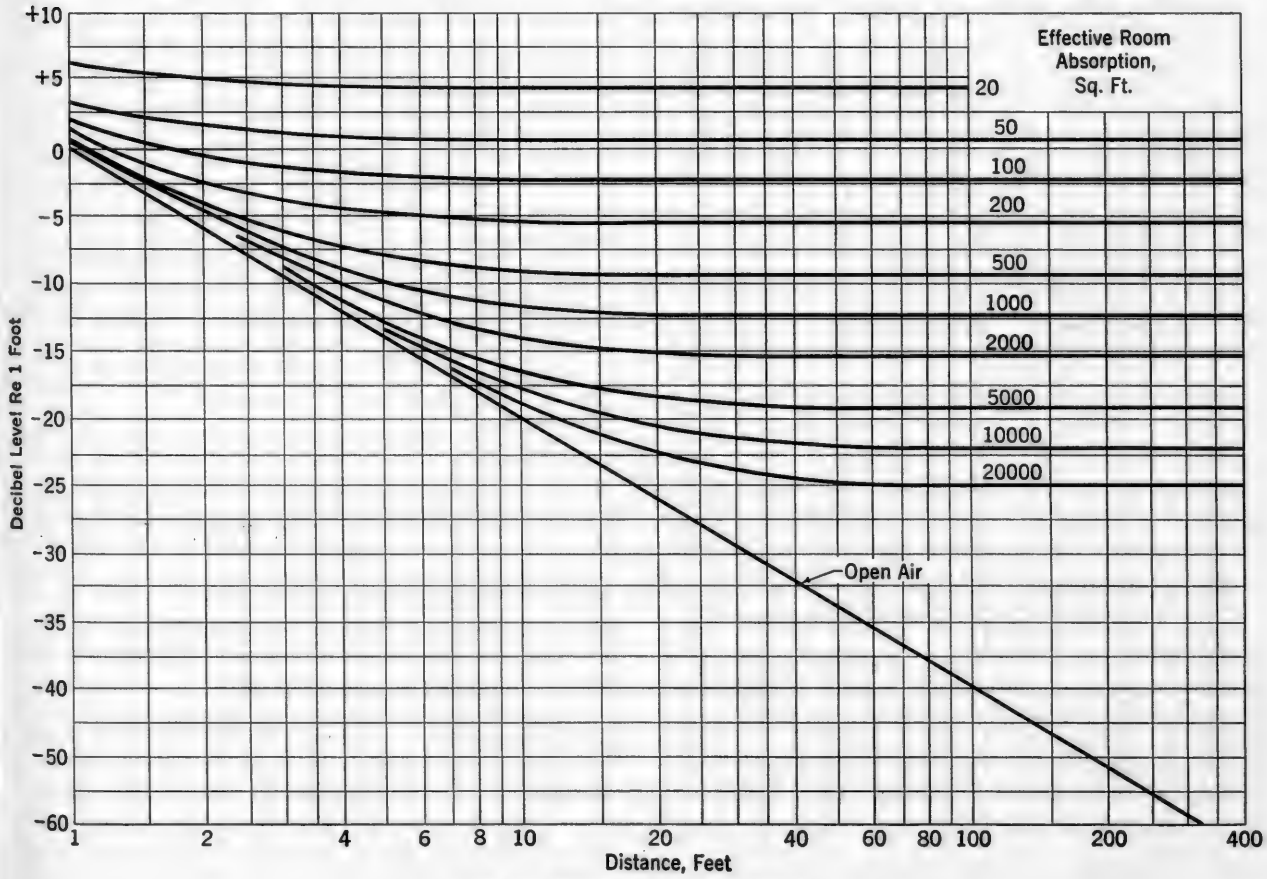
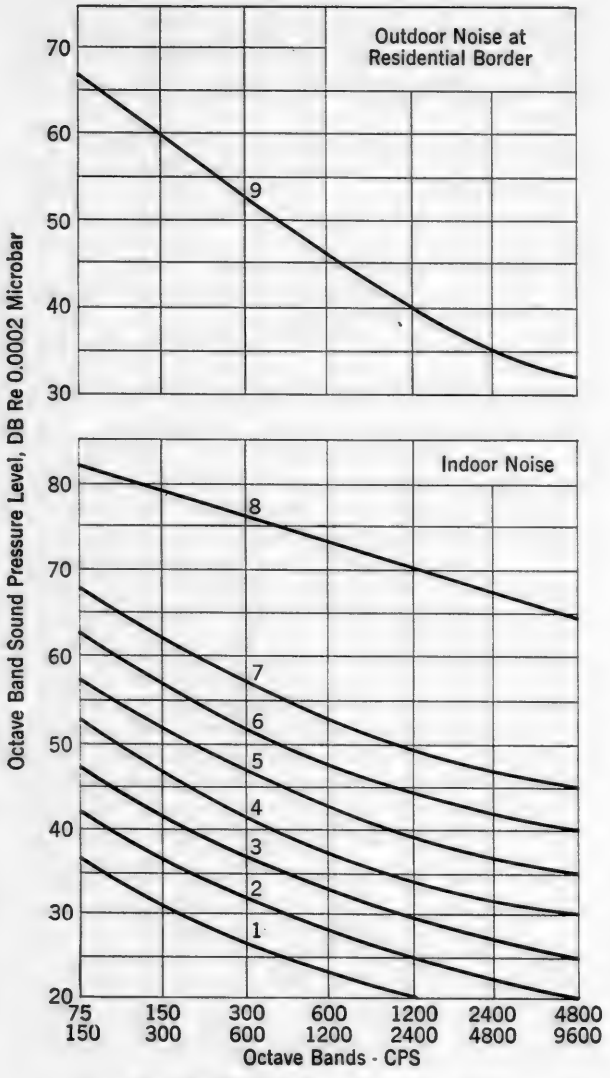


Fig. 5. Noise reduction in rooms.



1. BROADCAST STUDIO
2. QUIET SCHOOL, HOME, CONCERT HALL
3. MOTION PICTURE THEATRES
4. LECTURE ROOM
5. RESTAURANT, DEPARTMENT STORE
6. OFFICE WITH BUSINESS MACHINES
7. QUIET FACTORY
8. NOISY FACTORY

Fig. 6. Design goal noise levels.

room, and the second a hard-walled room with people inside which might represent an occupied factory space or gymnasium without acoustic treatment. The third category is a live room which might be represented by the typical church with acoustical treatment. The fourth category is a medium-live room which might be represented by the typical office or a larger room such as a gymnasium with a considerable amount of acoustical material, and the fifth a medium-dead room which might sound like a typical room in a house. Very few large rooms are ever this dead unless they have acoustic treatment designed for speech. Knowing the room volume and room type, the effective absorption can be found from Fig. 4.

The effective absorption found can be used with Fig. 5 to determine the noise reduction due to the room characteristics. Figure 5 shows how noise level decreases with distance from the fan or duct opening for particular values of effective room absorption; the lower straight line being for outdoor conditions. Since we are usually interested only in levels away from the fan the straight horizontal portion of the curve should be used. If people will be close to the fan it will be necessary to use the actual distance between the people and the fan or duct outlet to find the noise reduction.

If the expected fan noise level in a room is greater than the fan noise permissible in that type of room noise reduction is necessary. Figure 6 shows the maximum permissible fan noise in various rooms. Subtract the acceptable levels in octave bands from the levels expected within the room to find the number of decibels in each octave band which must be eliminated.

Fan Noise Reduction

There are several methods which may be used to reduce the noise produced by fans. Some of the more common ones are: Putting an acoustic lining in the duct between the room and the fan; putting a plenum chamber in the ventilating system; using a quieter fan (one with a lower tip speed); or placing proprietary mufflers or duct silencers in the ventilating system. Different situations make the use of one method or another more profitable for the ventilating engineer. The advantage of using a fan which produces less noise is quite obvious; however, the lower noise producing fans usually have a lower tip speed and, therefore, a larger blade diameter for a given air flow. It is usually necessary to use larger ducts if quieting is necessary when installing a lower tip speed fan. The use of a plenum chamber is usually a little more expensive than lined ducts. However, if the ventilating fan is installed on the roof of the building plenums are sometimes used to reduce outside noise. The use of lined ducts is usually quite economical, even if a length of lined duct, which would not ordinarily be required, is installed solely for the purpose of reducing the ventilating system noise. Most proprietary mufflers and duct silencers are made by dividing a duct into many sections with splitters or an egg crate construction so that a much larger amount of acoustic lining can be placed in a smaller space. Proprietary mufflers are usually a little more expensive than simple lined ducts, but where space is at a premium they are definitely the best solution.

Air Flow Noise

After the fan has been selected it is necessary to size the required ducts. There is one major acoustic consideration in determining duct size and that is the noise generated by airflow through the ducts. A small duct with a high air velocity can produce almost as much noise as the ventilating fan. To insure that the proper air velocities are maintained, Table 3 has been prepared to allow the ventilating engineer to design a ventilating system without fear of getting into trouble from air flow noise. The figures given in this table are approximate and should, naturally, be changed whenever there are either more or less stringent requirements for the room being ventilated.

In most cases, unless ducts are very long (50 feet or more), there will be very little noise reduction unless they are lined; therefore, it will be reasonably accurate to omit the calculation of noise reduction in unlined

TABLE 3—MAXIMUM AIR VELOCITIES FOR VENTILATING ROOMS

Room Volume, Cu. Ft.	Noise Curve, Fig. 8	Effective Absorption, Sq. Ft.	Maximum Velocity, Ft. per Min.	
			At Grille	With No Grille
below 10,000	below 3	all	1000	1300
below 10,000	5-3	all	1500	1800
below 10,000	above 5	all	2000	2300
above 10,000	below 3	below 1000	1200	1500
above 10,000	5-3	below 1000	1600	2000
above 10,000	above 5	below 1000	2000	2400
above 10,000	below 3	above 1000	1500	1800
above 10,000	5-3	above 1000	2000	2400
above 10,000	above 5	above 1000	2400	2800

ducts. There is, however, a reduction in noise level at any duct junction. If a duct is split so that one-half the air flow goes to or from one room and the other half to or from another, the sound level in each room will be 3 decibels lower than that in the duct before the junction. If the air flow is divided so that 25% of the air goes in or out of one room and 75% in or out of another room, the room into which 25% of the air flow goes will have a noise level approximately 6 decibels less than in the original duct before splitting and the noise level in the room into which 75% of the air flow goes will have a sound level approximately 1 decibel below the level in the duct before splitting. In order to calculate the effect of these junctions on the noise level in the room it will be necessary to follow the air flow path from the fan to the room under consideration. The percentage that should be used in all cases is the total air being supplied or exhausted from the room divided by the total air being pumped by the fan, or fans, in the system. This then is used with Fig. 7 to find the reduction due to duct branching. This reduction is subtracted from the noise produced by the fan or the total of all the fans in the system if there is more than one. If, for any reason, one of the rooms being ventilated by the fan requires a lower noise level than the other rooms it will usually be more expedient to calculate the fan noise which will be present in that room first. After designing a noise reduction system which brings the level in the room to that which is desired it will usually be found that the noise level in the other rooms will need no added reduction.

Lined Ducts

Figure 8 shows the noise reduction per foot of duct in each octave band for two thicknesses of available liners, one being one inch thick and the other one-half inch thick. It is almost always most economical to use one inch thick material because it has about five times the absorption of one-half inch materials at low frequencies. Because a duct lined with acoustical material produces a great deal more attenuation in the higher frequencies than it does in the low frequencies it is usually sufficient to calculate attentuations in the 75-150 cps band. In most cases the noise levels in the other octave bands will be substantially below those required for a satisfactory installation. It is, however, suggested that anyone who has not had much experience in calculating noise levels produced by fans calculate the levels in each octave band until he has become so familiar with the process that he knows when it is not necessary to calculate the noise levels and reductions in the highest 6 octave bands.

There is considerable evidence that acoustical materials placed at turns and bends in a duct produce more noise reduction than those placed in a straight section of duct. Although there are not many good experimental data describing the reductions, it will be of definite advantage to place acoustical material at turns and bends in the duct, whenever there is a choice.

Splitters

Additional noise reduction in ducts may be obtained by installing splitters, which are parallel slabs of acoustical material placed in a duct with their smallest dimensions across the direction of air flow. Sometimes splitters are installed in an egg-crate cross-section. Splitters increase the perimeter-area ratio and, therefore, increase the attenuation per foot. When using splitters it is necessary to consider only one of the subdivisions of the duct in determining the noise reduction per foot. The primary advantage of splitters is that the required noise reduction can be obtained in a shorter length of duct.

It can be seen from Fig. 5 that an increase in the effective absorption of the room will reduce noise in the room at a distance from the fan or duct outlet, and in many cases make sounds more pleasing to the observer. Therefore, whenever a noise reduction of less than 10 db is required it would be wise to investigate the possibility of installing acoustical material in the room.

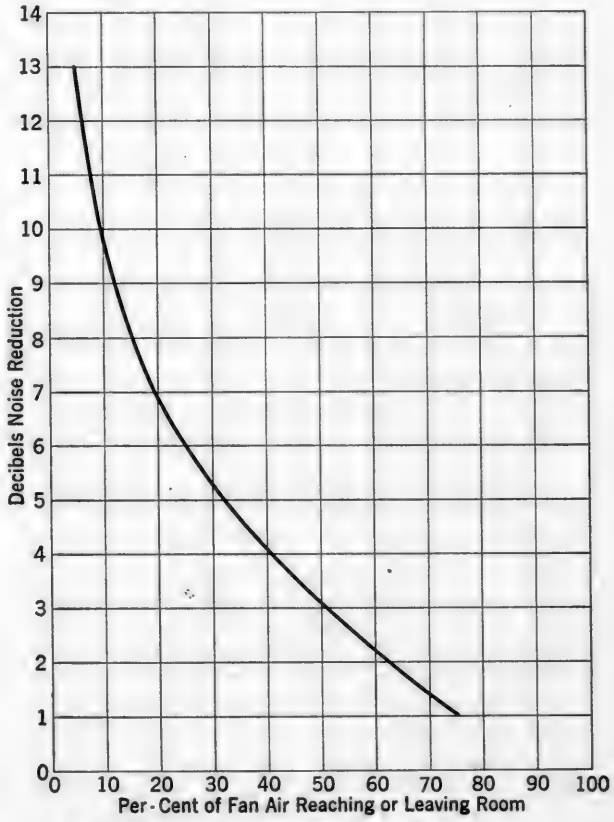


Fig. 7. Noise reduction due to duct branching.

Another method of reducing noise in ducts in a reasonable short space is the use of a large volume plenum chamber with the duct entering one side and leaving the other. It is possible to place a considerably larger amount of acoustical material in a short length of plenum than it is in a similar length of duct. Plenums also allow the use of thicker acoustical material and proportionately larger noise reductions in low frequencies than those usually found in a lined duct. The noise reduction obtained by using a plenum chamber can be calculated by using Fig. 9. Although plenum chambers are not usually an economical method of producing noise reduction there are some cases where they are justified even though they cause a large loss in pressure. For example, when the fan outlet is on the roof of a building the plenum, besides reducing noise, can be set over the fan to keep moisture from the fan opening. The outside opening of the plenum can be put in such a position that it directs sound away from the direction in which the outside noise may be the most objectionable.

The noise produced by a fan varies approximately as the 5th power of the blade tip speed. For this reason, for the same air delivery a large diameter low speed fan gives less noise than a small diameter high speed fan of the same horsepower. If it is determined that a considerable amount of noise reduction is necessary in the room being ventilated it may be desirable to install a larger diameter lower speed fan than the one originally selected. The amount of noise which will be produced by this larger diameter low speed fan can be estimated by the use of a nomogram, Fig. 2, or, preferably, by checking the manufacturer's noise specifications for various fan sizes. When a larger lower speed fan is used it will usually be necessary to use ducts of larger cross-section so that the loss in air delivery due to frictional losses in the duct will not be significant.

Outdoor Noise

Up to this point, consideration has been given only to the amount of noise which is directed to the room being ventilated. Usually a fan installation will deliver approximately the same amount of noise toward its delivery side as toward its inlet side. The noise on the outlet side may be high enough to be disturbing to people outside the building. To calculate the amount of noise which will reach any particular area out of doors the lowest sloping line on Fig. 5 should be used. By using the distance to the nearest residential boundary the reduction of noise due to distance will be found. This reduction should be subtracted from the level produced by the fan to give the level at the nearest residence. To establish criteria for acceptable noise levels in residential areas, data contained in a new proposed Chicago Zoning Ordinance have been used. This proposed ordinance states that the following noise levels from an industrial plant should not be exceeded at the nearest residential boundary.

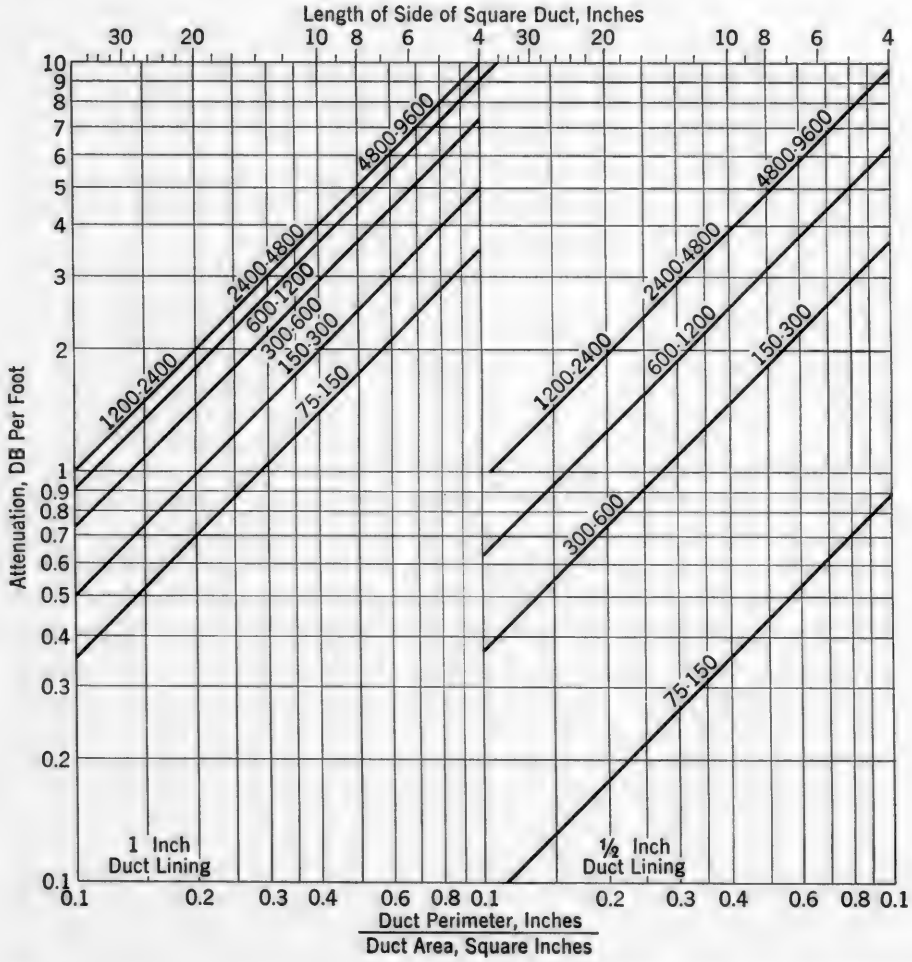


Fig. 8. Attenuation of lined duct.

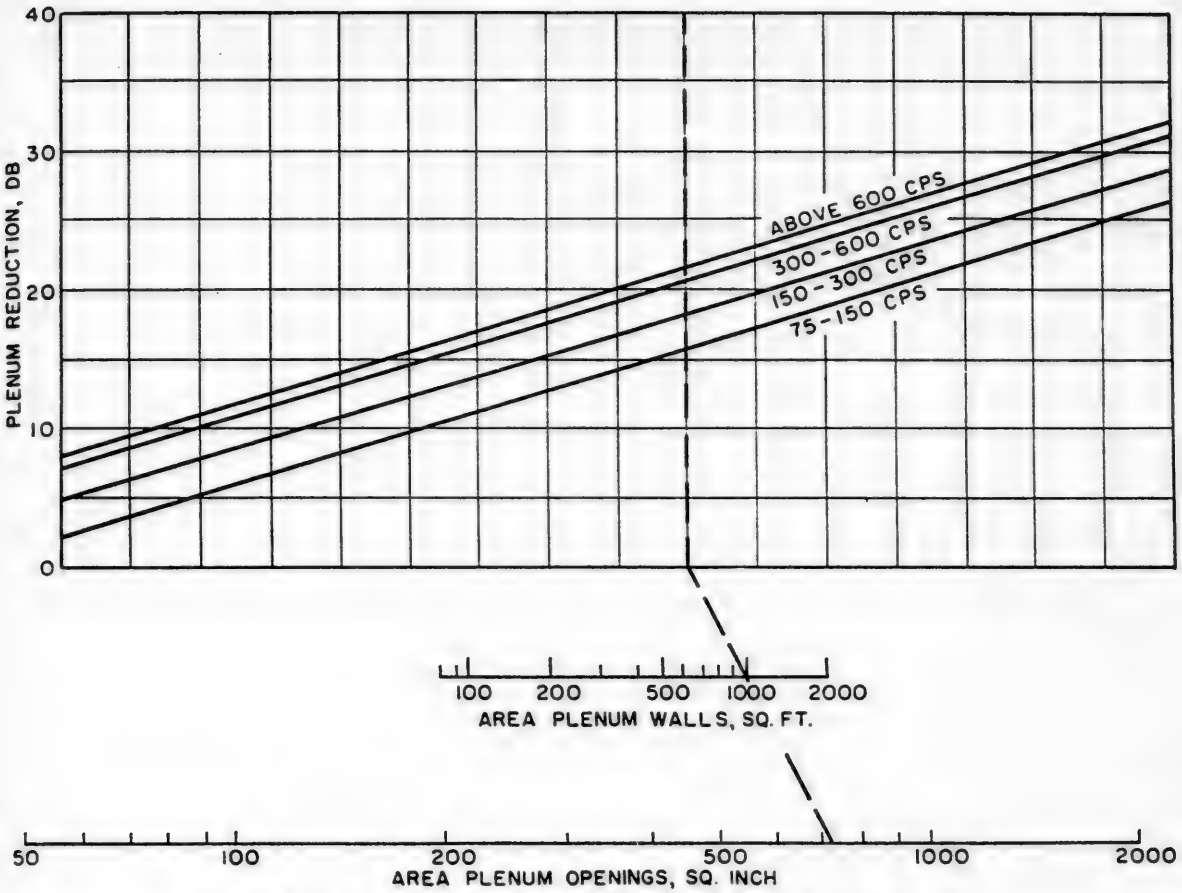


Fig. 9. Noise reduction of single plenum lined with 1½ inches glass fiber.

75- 150 cps	67 db
150- 300	60
300- 600	52
600-1200	46
1200-2400	40
2400-4800	35
4800-9600	31

The above values are shown as curve 9 of Fig. 6. For neighborhoods particularly sensitive to noise, these levels might be reduced 5 to 10 db.

If the levels computed at the nearest residential boundary exceed the outdoor criteria, the noise reduction required may be obtained by use of methods already discussed.

Example of Fan Noise Calculation for a Factory Office

To simplify calculations, a work sheet has been prepared. Use of the work sheet Fig. 10A and 10B, is explained by the following example predicting the fan noise which will be present in a factory office.

The factory office being considered has the following specifications. Its size is 30 ft x 20 ft x 10 ft and it requires 1400 cu ft of air per minute. It is to be ventilated by a single exhaust fan. The fan selected for this problem has a rating of 1/6th horsepower and a tip speed of 3420 feet per minute. Since the manufacturer has not specified the noise rating on this fan it will be necessary to estimate the fan's noise output from Fig. 2. Drawing a line through 1/6th horsepower and 3420 feet per minute on this figure shows that the fan should have an estimated sound pressure level in the 75-150 cps band of 77 db. By the use of the table at the bottom of this same figure the following sound pressure levels can be expected in each octave band.

75- 150 cps	77 db
150- 300	72
300- 600	67
600-1200	62
1200-2400	57
2400-4800	52
4800-9600	47

These numbers are entered in step 2 of the work sheet. Next, the dimensions and volume of the room should be entered in step 3 of the work sheet. The factory office would normally be considered a hard-walled room with an audience. This information should be entered in step 4 of the work sheet. By the use of Fig. 4, it is found that a hard-wall room with audience, with a volume of 6000 cubic feet, will have an effective absorption of 230 square feet. By the use of Fig. 5, it can be determined that a room with an effective absorption of 230 square feet will have a noise reduction of approximately 6 db because of the characteristics of the room. This information is entered in step 5 of the work sheet. By subtracting step 5 from step 2 the expected fan noise levels in the room will be found. These are as follows:

75- 150 cps	71 db
150- 300	66
300- 600	61
600-1200	56

FIG. 10A - EXAMPLE OF FAN NOISE CALCULATION FOR A FACTORY OFFICE

NO. OF FANS 7 FAN H.P. 1/6 TIP SPEED 3420 CFM/FAN 1400	TOTAL FANS INLET SOUND POWER MICROWATTS, FIG. 1	FAN INLET SOUND PRESSURE LEVEL AT 1 FOOT, FROM FIG. 2	REDUCTION DUE TO ROOM ABSORPTION AND DISTANCE FROM FIG. 5	EXPECTED FAN NOISE LEVEL IN ROOM STEP 2 - STEP 5	MAX. PERMISSIBLE FAN NOISE IN ROOM FROM FIG. 6	NOISE REDUCTION REQUIRED STEP 6 - STEP 7	DUCT BRANCHING REDUCTION FROM STEP 9	NOISE REDUCTION TO BE ADDED STEP 8 - STEP 10
STEP	1	2	5	6	7	8	10	11
75- 150 CPS		77	6	71	63	8	0	8
150- 300 CPS		72	6	66	57	9	0	9
300- 600 CPS		67	6	61	52	9	0	9
600-1200 CPS		62	6	56	47	9	0	9
1200-2400 CPS		57	6	51	44	7	0	7
2400-4800 CPS		52	6	46	42	4	0	4
4800-9600 CPS		47	6	41	40	1	0	1

3. ROOM VOLUME L x W x H = CUBIC FEET

30 x 20 x 10 = 6000

9. DUCT SYSTEM BETWEEN FAN AND ROOM

PERCENT FAN AIR REACHING ROOM 100 REDUCTION 0

4. ROOM USE Factory Office ROOM RATING 6 FROM FIG. 6

ROOM TYPE Hard w/Audience ROOM ABSORPTION 230 FROM FIG. 4

1200-2400	51
2400-4800	46
4800-9600	41

This then is the spectrum of the noise which the fan will produce in the factory office without any quieting.

It is next necessary to determine the permissible noise levels in a room of this type. Figure 6 is used for this purpose. The table at the bottom of Fig. 6 indicates that a factory office should have a noise spectrum like that shown in curve 6. This curve gives the following values for permissible noise in the various octave bands.

75- 150 cps	63 db
150- 300	57
300- 600	52
600-1200	47
1200-2400	44
2400-4800	42
4800-9600	40

Subtracting step 7 from step 6 gives the following values of noise reduction required to make the fan acceptable in a room being ventilated.

75- 150 cps	8 db
150- 300	9
300- 600	9
600-1200	9
1200-2400	7
2400-4800	4
4800-9600	1

Since all the air produced by this ventilating fan is used to ventilate one factory office there will be no noise reduction due to duct branching. Therefore, step 9 should be filled in showing that 100% of the air reaches the room being ventilated and there is no noise reduction obtained. Step 11 of the work sheet will, therefore, have the same values as step 8.

It will now be necessary to reduce the fan noise by one of the noise reduction methods previously described. Since the required noise reduction is slight it can probably be obtained most economically by the use of a short section of lined duct.

Table 3 shows that for a room of less than 10,000 cubic feet with an acceptable noise level of curve 6 or above that 2300 feet per minute air velocity is acceptable with no grille. It will, therefore, be necessary to design a lined duct which does not exceed this air velocity. If a 24 inch x 6 inch duct is lined with one inch acoustical material it will have an inside area of 88 square inches and an inside perimeter of 52 inches. This will give a satisfactory air flow. The inside and outside dimensions of the lined duct, as well as the perimeter/area ratio of this duct will be 0.59. Using Fig. 8, the following attenuations in db per foot will be found for a duct of this size lined with one inch acoustical material.

75- 150 cps	2.1 db per foot
150- 300	3
300- 600	4.4
600-1200	5.4
1200-2400	6
2400-4800	6
4800-9600	6

FIG. 10B - EXAMPLE OF FAN NOISE CALCULATION FOR A FACTORY OFFICE

	OUTDOOR NOISE PREDICTION						PLENUMS			LINED DUCTS				
	FAN OUTLET SOUND POWER MICROWATTS, FIG. 1	FROM FIG. 2 - FAN EXHAUST SOUND PRESSURE LEVEL AT 1 FOOT	FROM FIG. 5 REDUCTION DUE TO DISTANCE	STEP 12 - STEP 14 LEVEL AT NEAREST RESIDENCE	FROM CURVE 9 - FIG. 6 DESIRED LEVEL AT RESIDENCE	STEP 15 - STEP 16 REQUIRED REDUCTION	NOISE REDUCTION TO BE ADDED SAME AS STEP 11	FROM FIG. 9 & STEP 18 NOISE REDUCTION FROM PLENUM	STEP 19 - STEP 20 ADDED REDUCTION NEEDED	SAME AS STEP 19 NOISE REDUCTION TO BE ADDED	FROM FIG. 8 AND STEP 23 REDUCTION DB/FOOT	22 DIVIDED BY 24 REQUIRED FEET OF LINED DUCT	REDUCTION USING 3.8 FOOT DUCT	STEP 6 - STEP 10 - STEP 26 EXPECTED FAN NOISE IN ROOM
STEPS	1	12	14	15	16	17	19	20	21	22	24	25	26	27
75- 150 CPS		77	29	48	67	-				8	2.1	3.8	8	63
150- 300 CPS		72	29	43	60	-				9	3	3	11	55
300- 600 CPS		67	29	38	52	-				9	4.4	2.1	17	45
600-1200 CPS		62	29	33	46	-				9	5.4	1.7	20	36
1200-2400 CPS		57	29	28	40	-				7	6	1.2	23	30
2400-4800 CPS		52	29	23	35	-				4	6	.7	23	25
4800-9600 CPS		47	29	18	31	-				1	6	.2	23	20

13. DISTANCE FROM FAN TO NEAREST RESIDENTIAL BOUNDARY 30 '
USE FIG. 5 TO GET STEP 14.

18. DUCT SIZE-____" x____" OUTSIDE
AREA _____ SQ. IN.
WALL AREA OF PLENUM OR ROOM
_____
SIZE OF PLENUM___' x___' x___'
USE FIG. 9 TO GET STEP 20.

23. LINED DUCT
SIZE = 22 " x 4 " INSIDE
24 " x 6 " OUTSIDE
PERIMETER = 52 " INSIDE
AREA = 88 SQ.IN. INSIDE
PERIMETER / AREA = .59
USE FIG. 8 TO GET STEP 23

These are listed under step 24.

Dividing step 22, which lists the noise reductions required, by step 24 gives the following lengths of lined duct required for each octave band.

75- 150 cps	3.8 feet
150- 300	3
300- 600	2.1
600-1200	1.7
1200-2400	1.2
2400-4800	.7
4800-9600	.2

These are listed under step 25.

By using 3.8 feet of lined duct the following attenuations are obtained in each octave band.

75- 150 cps	8 db
150- 300	11
300- 600	17
600-1200	20
1200-2400	23
2400-4800	23
4800-9600	23

These values were obtained by multiplying 3.8 by the number of db per foot in each octave band. The results are shown in step 26 of the work sheet. By subtracting step 10 and step 26 from step 6 the following noise levels for the room are obtained.

75- 150 cps	63 db
150- 300	55
300- 600	44
600-1200	36
1200-2400	28
2400-4800	23
4800-9600	18

These are listed under step 27.

These levels are equal to or less than those required in the room; therefore, the fan installation is satisfactory with 3.8 feet of lined duct added.

If the levels in the room are not of interest, the fact that the room is satisfactory can be shown by comparing the reductions in step 26 with the reductions required in step 22.

Having determined means for reducing the fan noise inside the room to a level which will be satisfactory, it is next necessary to determine what noise reduction, if any, is needed on the outside of the building. If it is assumed that the fan produces the same noise levels on the discharge side as it did on the inlet side the numbers in step 12 of the work sheet are simply a duplication of the numbers in step 2 of the work sheet.

For our example, it is assumed that the nearest residential boundary to the fan is at a distance of approximately 30 ft. The reduction of fan noise due to distance can be found from Fig. 5. The lowest line on this figure represents the reduction of noise with distance out of doors. It can be found that a distance of 30 feet represents a noise reduction of approximately 29 db. 29 db should then be entered in each of the spaces in step 14 of the work sheet.

Subtracting step 14 from step 12 gives the following expected sound levels at the nearest residential boundary.

75- 150 cps	48 db
150- 300	43

300- 600	38
600-1200	33
1200-2400	28
2400-4800	23
4800-9600	18

These are listed under step 15.

The maximum permissible noise level at a residential boundary is shown as curve 9 of Fig. 6. The values for each octave band from this curve should be entered in step 16 of the work sheet.

The comparison of the levels of fan noise at the residential boundary (step 15) with the noise level criteria (step 16) shows that the fan noise will be far below the maximum limit and, therefore, should be satisfactory without resorting to any quieting measures. If it were necessary to reduce the fan noise in order to make it acceptable the noise reduction could be obtained by the same methods described for noise reduction indoors.

Noise Calculation for a Gymnasium

First, the ventilating system will be designed for a gymnasium which will be used only (1) for basketball games. (2) for dances, (3) for meetings where a speaker and audience will be required. Naturally, if the gymnasium is designed so that it may also be used for an auditorium it will be over-designed acoustically for the other gymnasium uses.

Referring to Fig. 6, curve 6 gives an acceptable level for use of the gymnasium for basketball games, curve 4 gives the acceptable levels when using the gymnasium for a dance, and curve 3 shows the acceptable levels when using the gymnasium for speech with a public address system as an auditorium.

The gymnasium to be studied is approximately 110 ft x 100 ft x 30 ft high with a volume of 330,000 cu ft. It has permanent wooden seats for an audience of 1500. The required ventilation is approximately 25,000 cu ft of air per minute. This might be provided by 7 fans, ¼ horsepower each, with tip speed of 2510 feet per minute. The use of the nomogram, Fig. 2, shows that a fan of this type would produce about 72 db at one foot in the 75-150 cps octave band. By adding the sound pressure level of 7 such fans from Fig. 3, we would get a total sound pressure level 8 db higher than one fan. By using the table of Fig. 2, we find what the 7 fans will produce in various bands at one foot. By the use of Table 2 we find that a gymnasium is considered a hard-walled room with audience. By the use of Fig. 4 we find that a hard-walled room with audience with a volume of 330,000 cubic feet has an effective absorption of 3300. By the use of Fig. 5, we find that the noise reduction at a distance from the source in a room with an effective absorption of 3300 is 17 db. Subtracting this reduction from the sound pressure level of each octave at one foot we find the expected fan noise level in the room. A conservative maximum permissible noise level in a room of this type, found from, say curve 6 of Fig. 6, shows that the fan noise level in the room will be almost exactly equal to the maximum permissible fan noise level in this room. Therefore, no noise reduction would be required.

When the same gymnasium is used for a dance a somewhat lower permissible fan noise level will be used, such as that on curve 4 of Fig. 6. During a dance there will probably not be any more people in the gymnasium than there would be during a basketball game: therefore, the same audience requirements should be sufficient and the same fan system can be used. The figures in step 1 through step 6 of the work sheet will, therefore, be the same as fans for the previous example. The permissible noise level, however, will be approximately 10 db less than it was for a basketball game. Since we have installed separate fans there will be no sound level reduction due to duct branching. In order to obtain the necessary noise reductions perhaps the easiest system would be to install a short section of lined duct on the outlet of each fan. It will first be necessary to determine the duct size which will give a satisfactory air velocity. The fans selected each deliver 3710 cu ft of air per minute. The maximum air velocity in a large room with grilles and having an effective absorption of more than 1000 is 2000 feet per minute. However, in order to insure a small duct pressure loss we will select a duct with a cross-section of about 12 inches x 36 inches. By lining a duct of this size with one inch of acoustical material we find that the inside perimeter of the duct is 88 inches and the inside cross-sectional area is 340 square inches, giving a perimeter/area ratio of 0.26. By the use of Fig. 8, we find that a duct with a perimeter/area ratio of 0.26 has an attenuation in the 75-150 cps octave of 0.9 db per foot. By dividing the 10 db required reduction by 0.9 we find that 11 feet of lined duct will give the desired noise reduction in the low octave.

Similar calculation and tabulation of values for other octaves shows that by using 11 feet of lined duct sound pressure levels will be satisfactory for the gymnasium used for dances.

If the gymnasium is to be used as an auditorium it will be possible to seat 1200 more people on the floor. Therefore, the required ventilation will be 45,000 cubic feet per minute. This can be supplied by 12 of the same fans used in the first and second examples. With 12 fans, Fig. 3 shows the total sound pressure level at one foot in the 75-150 cps band will be 83 db, and Fig. 2 gives the sound pressure levels at one foot for other bands.

In order to use the gymnasium for speech it will be necessary to add absorption to the room so that the gymnasium has a room type more like a school auditorium. From Table 2 we find that a school auditorium or lecture hall should be medium-live. Therefore, as shown in Fig. 4, absorption should be added to the walls until the total effective absorption is equal to about 12,000 sq. feet of perfect absorption. The method of obtaining the required effective absorption will not be discussed since this is not a problem for the ventilating engineer. The architect will be responsible for having the proper acoustic environment in the room. With an effective absorption of 12,000 square feet the reduction due to distance and absorption, as found from Fig. 5, will be approximately 23 db, giving an expected noise level in the 75-150 cps band of 60 db. The maximum permissible fan noise level in a school auditorium as found from curve 3 in Fig. 6, shows the noise reductions required at 75-150 cps to be 13 db. If we use the same lined duct and divide as before, we find that 15 ft of lined duct are required. The room will now be acceptable for use as either a gymnasium or auditorium. Whenever this room is used as a gymnasium only 7 of the fans need be turned on.

Control Conference Held

Report of conference held to meet demand for factual information regarding various aspects of controls and controlability as related to the fields of heating, ventilating and air conditioning.

BECAUSE of the increasing importance of the field of control, a control conference was organized by the Committee on Research of the American Society of Heating and Air-Conditioning Engineers. This conference, attended by company representatives and others was held at the ASHAE Research Laboratory, Cleveland, Ohio, on May 14.

The objective of the Conference was to bring to light the current status of control thinking and to point out directions of future programs and indicate where research and development are most critically needed. Representative viewpoints considered included those of the consultant, equipment manufacturer, contractor, control manufacturer and ultimate user.

Opening remarks were made by Elmer R. Queer, society president; Walter A. Grant, Carrier Corp., presided as chairman of the meeting.

Keynote Address

Peter B. Gordon, of Wolff and Munier, Inc., in his keynote address, called attention to the fact that the control is one component of the entire heating system. Since the end of 1930, there has been rapid progress in the development of controls and, at present, an entirely new family of controls is available. The safety of plant operation and the comfort of building occupants depend on controls.

Those who planned this meeting wish to explore various segments of control to provide information of value to manufacturers, designers and users. As the air conditioning system and the working components become more complicated, there develops a greater need of control-know-how at all levels. Some systems have been designed without the full knowledge of control problems.

Boiler Control

The field of heat-exchanger equipment was covered by L. N. Hunter, National-U. S. Radiator Corp.

Boiler output can be controlled by boiler input, by on-off periods, or the fuel input to the boiler can be varied by changing the supply of air.

When the boiler is operating at one-half output, with throttled control, the efficiency falls to 70%. When operating at 100% capacity, the efficiency is 82%; when operating at one-third capacity with on-off periods, the efficiency is 78% and for the same operating capacity but controlled by throttling, the efficiency is 70%.

Thermal shock is an important boiler condition and this shock can cause cracked sections and loosening of tubes. The greatest thermal shock takes place early in the morning. Damage does not happen immediately but it occurs after a period of time. Boiler equipment and design have an influence on this problem.

Faulty Sizing

H. A. Lockhart, Bell and Gossett Company, spoke on energy and mass distribution. He said that in 90% of all cases, the pumps installed are too large. Faulty pump operation will make the question of control difficult.

Although pipe grows old and the flow coefficient changes with pipe age, the pump does not know what factor was selected in design and therefore control becomes more difficult. There is a great need to know more about controls and how they tie together.

Production

Control production was covered by W. P. Chapman of Johnson Service Company. Manufacturers know that there must be a matching of components. In design, a steady state condition of load is assumed but we know that this cannot happen for we have transient loads. We must use tolerance and not pin point accuracy. A large amount of work must be done to learn the characteristics of conditions that we will meet in practice.

There is a definite demand for automation because of the large increase in labor costs.

Designer and Contractor Problems

T. F. Rockwell, consulting engineer, in presenting the consultant-designer side, said that the product designer must investigate the question more comprehensively in order to safeguard his client's interests. In the early stages of design, he must know if he is to design for maximum comfort, how many hours the system will operate and at what loads and whether he will design for continuous operation.

E. R. Teske, Heating Piping & Air Conditioning Contractors Chicago Association, spoke on the contractor-user, and stated that there is a need for better dissemination of information throughout the industry. There is a need for standards of a basic content, need for information on what a contractor can and cannot do, and a need for standards at the manufacturers' level. Education is also required on system application.

E. F. Snyder, Jr., Minneapolis-Honeywell Corp., stated that in the field of controls, it is important to know where we are going, but unfortunately most of those concerned do not have this direction.

Resolution Approved

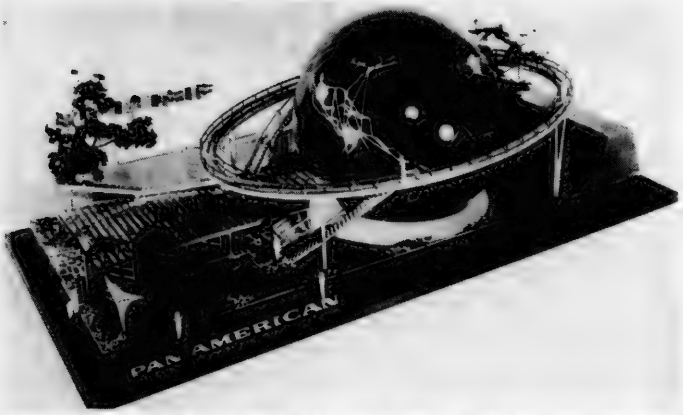
As a result of this conference, Harold W. Alyea, chairman of the committee that arranged the conference on control, submitted the following resolution which was approved by those present:

"The meeting has indicated a need for research, better educational facilities, and means for coordinating such. Since the society is set for conducting such research, steps should be taken by the society for appropriate action."

Burgess H. Jennings, director of research for the society, introduced several members of his staff who described briefly some of the studies now being conducted.

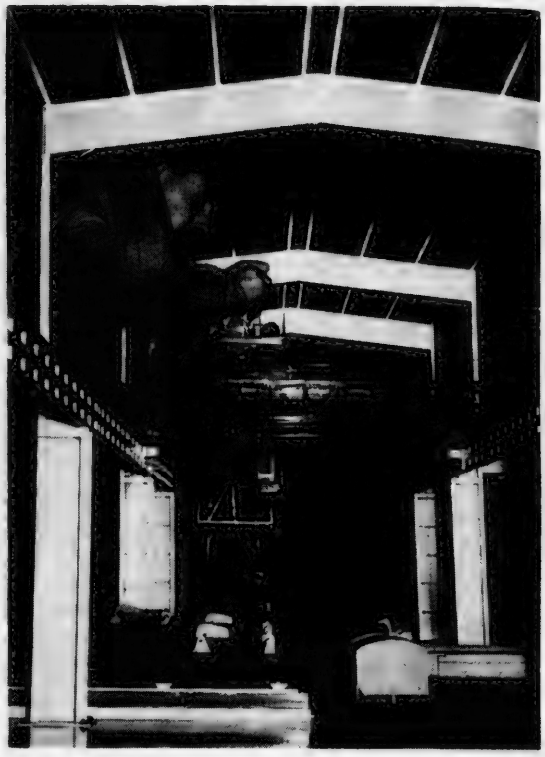
Following the formal part of the program, time was allowed for audience participation.

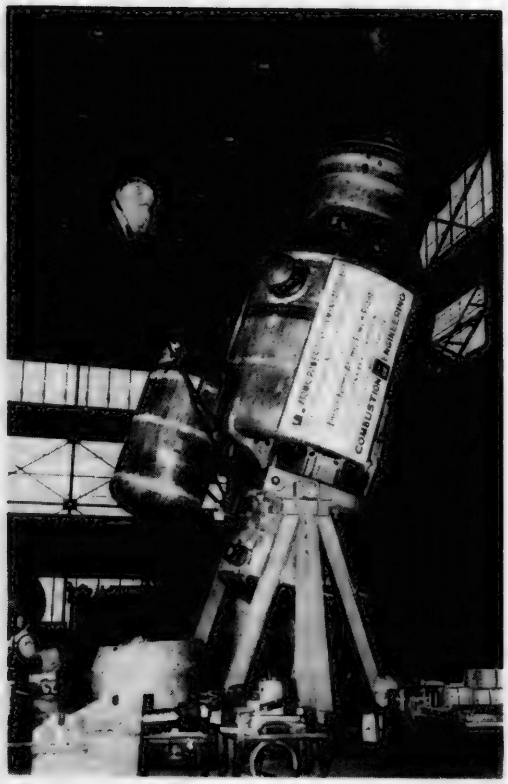
Picture

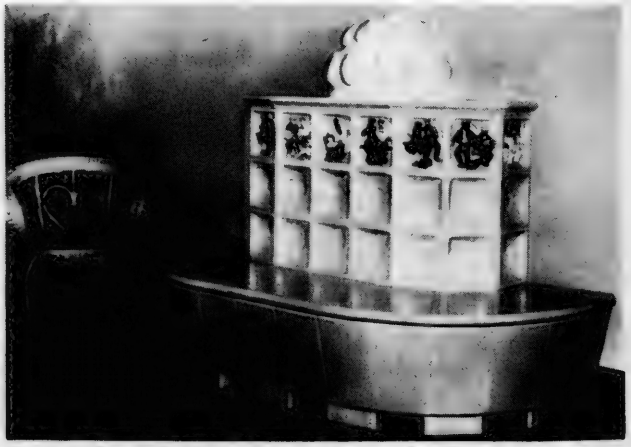


BRUSSELS WORLD FAIR. (Above) Scale model represents Pan American's 52-ft dia, 100,000 cu ft "world" theater, capable of seating up to 180 Fair visitors. Air conditioned and supported by five Chrysler Airtemp 3-hp mobile air cooled conditioners, the sphere is made of blue, vinyl-covered nylon fabric manufactured by U.S. Rubber Co. At conclusion of Fair, Pan American plans to deflate the re-usable theater and return it to the States for a series of one-week showings in major cities.

(Right) The Demag-built model which the European Coal and Steel Community is exhibiting at the Fair covers an area of 7750 sq ft and represents an entire basic industry from coal and ore mines, transportation facilities, coke ovens, by-product plants, power station, and sintering plant to blast furnaces, steel works, and rolling mills. Visitors can set most of the model installations in motion. Picture shows part of the model being assembled.



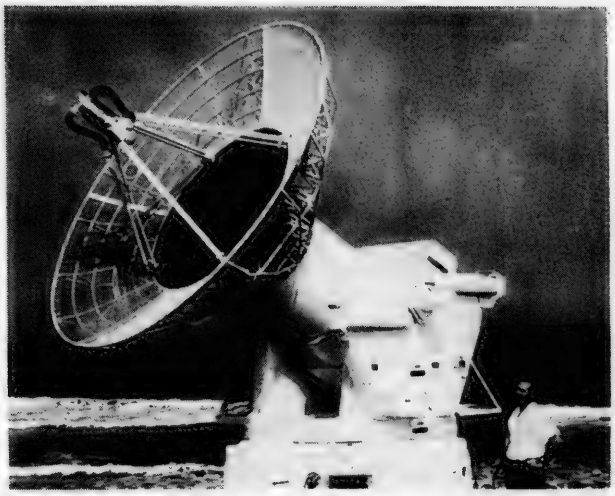


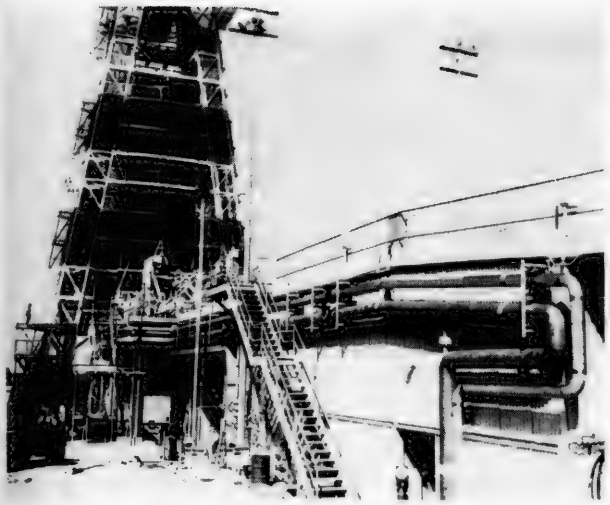


THE OLD AND THE NEW. "Kachelofens" such as the one above — ancient Austrian decorative tile heating stoves — usually have wood stoves in the back to warm them. However, at Rickey's new Lake Tower Suites in Palo Alto, Calif., the tile ovens are heated with the same Westinghouse electric baseboard heating used to heat the other rooms.

REACTOR VESSEL. Shown here being turned from vertical position to horizontal, preparatory to shipment to the Enrico Fermi Atomic Power Plant, America's first full-scale fast-breeder nuclear power plant, is the Atomic Power Development Associates-specified, sodium-cooled reactor vessel. Detailed design and construction were done by Combustion Engineering, Inc., at its Chattanooga Division.

Paragraphs





SPACE-AGE SPECIALTIES. (Above) Radar tracking station on the Florida coast traced the Navy Vanguard satellite as it rose into orbit. These electronic "eyes" pierce clouds and darkness to compute tracking information that formerly took a week to decipher. The tower supporting the radar and the control center below are completely air conditioned by Carrier Corporation equipment to protect the exacting accuracy required from the instruments.

(Left) Fuel supplied through Foamglas (Pittsburgh Corning Corp.)-protected tanks and lines successfully launched the rockets which carried the country's first satellites into orbit from Cape Canaveral launching site of the Air Force Missile Test Center. A typical launching pad is shown with fuel lines in foreground. Photo, U. S. Air Force.

ROYAL TREATMENT. At the Zoological Garden of Basel, Switzerland, these penguins, one Emperor and three Kings, are kept cool and comfortable by a Dunham-Bush unit cooler. A constant temperature of 46 deg F is required for the proper care of the birds.

GIANT FANS. These American Blower gas recirculating fans will each handle 251,000 cfm of 715 deg F gas, and are the largest fans yet used for this service. When installed at Detroit Edison's St. Clair Station, they will serve a Babcock and Wilcox boiler with a capacity of 2,100,000 lb steam per hr. The 13-ton housings and 6-ton wheel dwarf the 6-ft engineer shown inspecting them during construction.

LOUIS BLENDERMANN ON

PIPING AND PLUMBING

Evaluating Fire Protection Equipment

MANY articles have been written about the various fire protection systems that can be used in buildings, how they are installed and how utilized. Another viewpoint is presented in the article, rather than elaborate on the specific merits of one system or another.

Fire protection is a vast subject and, therefore, to limit the scope of this article, generalization was followed and some topics were touched lightly.

Before an engineer can proceed with the design of a fire protection system for a building, he must consider the nature of the building, its occupancy, its construction and the hazards related to its function. Adequate fire protection is more involved than just the process of conducting water into a building through a properly sized distribution system.

Recommended Sources of Information

To secure suitable data on fire protection, an engineer has at his disposal many sources of available data as compiled by a number of different organizations. Listed below are several such groups.

1. National Fire Protection Association, Handbook of Fire Protection by Crosby-Fiske-Forster.
2. Standards published by the National Board of Fire Underwriters.
3. Associated Factory Mutual's booklets.

These provide a wealth of information on fire protection and represent authoritative data. Actually, more factual data has been compiled by these organizations on the subject of fire protection than has been accomplished in some of the other allied fields associated with the plumbing industry.

Occupancy

The proposed occupancy of a building is one of the factors that an engineer must consider before proceeding with the design of an adequate fire protection system. The word "occupancy" is intended to mean the type of building and the prime function for which the building is intended. In this instance, we shall cover most occupancies under the following 5 major classifications:

1. Dwellings.
2. Public Buildings.
3. Mercantile.
4. Manufacturing.
5. Miscellaneous.

Briefly, "dwelling" cover those types of buildings where its inhabitants live and sleep. "Public Buildings" include those buildings where the inhabitants are either employed for a number of hours each day or assemble for a specific function in the building. An office building and a church are examples of this type of occupancy. "Mercantile" is intended to mean types of buildings where one engages in the handling of storage of merchandise. The inhabitants, therefore, may be considered as transients. A furniture store is an example of this type of occupancy. "Manufacturing" represents buildings where goods are manufactured, processed or fabricated. "Miscellaneous" covers all the other buildings where occupancies do not fall in the classifications listed.

An idea of the types of buildings that can be included under each classification of occupancy will be covered.

Basic Causes of Fire

While there are very many causes responsible for the origin of a fire, following is a list that covers 15 of the most common causes:

1. Smoking and matches.
2. Unknown origin.
3. Electrical—faulty or misused wiring and equipment.
4. Defective or overheated heating equipment.
5. Chimney flues—defective or overheated.
6. Sparks on roof.
7. Children and matches.
8. Lightning.
9. Flammable liquids.
10. Rubbish
11. Open fires, flames or sparks.
12. Electrical appliances.
13. Lamps, lanterns and stoves
14. Spontaneous combustion.
15. Hot ashes and coals.

Class of Fire

The different types of fires may be broken down into three distinct classifications. The classifications listed here are different from the NFPA grouping to simplify the contents of the two tables with this article.

Class A Fire. Fires originating with ordinary combustible materials where the quenching and cooling effects of quantities of water or solutions containing large percentages of water are of first importance in extinguishing this type of fire.

Class B Fire. Fires originating with electrical wiring or equipment where the use of a non-conducting extinguishing agent is of first importance.

TABLE I—RELATIVE DESIRABILITY OF EXTINGUISHING MEANS

Class of Fire	Priority No. 1	Priority No. 2	Priority No. 3
Class A	A-1	A-2	A-3
	Outside Hydrants Standpipe system Sprinkler system	Water-fog spray Wetting agents Steam	**CO_2 Systems** Hand extinguishers Portable units Fixed systems **Foam Systems** Dry foam Mechanical foam **Chemical Hand Extinguishers** Soda and acid Carbon tetrachloride Pyrene **Sand**
Class B	B-1	B-2	B-3
	CO_2 Systems Hand extinguishers Portable units Fixed systems	Inert gas	Water-fog spray
Class C	C-1	C-2	C-3
	CO_2 Systems Hand extinguishers Portable units Fixed systems **Foam Systems** Dry foam Mechanical foam **Water-fog Spray**	Inert gas	**Chemical Hand Extinguishers** Soda and acid Carbon tetrachloride Pyrene **Sand**

Class C Fire. Fires originating with flammable liquids, gases, greases and similar liquids or substances where a blanketing effect of CO_2, foam, water-fog spray or other agents suitable for this kind of fire is essential.

Classification of Hazards

The nature of specific fire hazards varies with the type of occupancy and the function of the building. For example, an apartment house is not subject to the same hazards as a plastics plant. In the apartment house, a fire is more likely to originate with the occupants of the building while in the plastics plant, the fire will most likely originate with the materials used and the nature of the work performed. Therefore, hazards may be classified as follows.

Common Hazard. This hazard includes all origins of fire that may be attributed to the occupants of a building or to the heating, electrical or other equipment or appliances normally associated with the function of the building. In addition, the accumulation of rubbish and other combustible materials in the building is a cause of fire and, since it is included under the responsibility of maintenance, it too belongs in this classification.

Special Hazard. This hazard includes all origins of fire that may be attributed to the specific nature of the work accomplished in the building as well as the materials handled and the equipment used.

Unknown Cause Hazard. Since many fires originate from unknown causes, it is important that this classification be included.

Of the three hazards, the greatest number of fires may be credited to the common hazard. Second in frequency, are the fires originating with special hazards.

Fire Extinguishing Agents

What are the available means for extinguishing fires that originate with the different causes? The following listing offers some indication of the assorted types of equipment and facilities that may be utilized.

Water.
- Outside hydrants.
- Stanpipe systems.
- Sprinkler systems.
- Water-fog spray.
- Wetting agents.

CO_2 Systems
- Hand extinguishers.
- Portable systems.
- Fixed systems.

Foam systems.
- Dry foam
- Mechanical foam

Chemical Extinguishers
- Soda and Acid.
- Carbon Tetrachloride.
- Pyrene.

Inert Gas

Steam

Sand

Also included are other methods that are not mentioned in the above listing as well as methods that have been recently developed and for which sufficient data has not yet been made available by the manufacturer.

Class of Fire and Extinguishing Agents

Now that we have covered the occupancy, class of fire, basic causes of fire and types of extinguishing agents, we shall attempt to show, through Table I, the relationship between the class of fire and the extinguishing agents.

Considering the relative desirability of the various extinguishing means as indicated in Table 1, it is apparent that the extinguishing means listed as Priority No. 1 in the tabulation affords the maximum protection for the class of fire indicated, and that it would be logical to assume that the first priority extinguishing means would be the most desirable means for any occupancy involving such class of fire.

Having determined the class of fire and the most desirable type of extinguishing means for protection against the fire, it is possible to relate the types of occupancy to types of buildings as well as the extinguishing means with regard to the complex occupancy of the various types of buildings. This evaluation can be set forth in Table 2.

Although only a few buildings were included under each type of occupancy, they are typical and offer a good example of the requirements that must be met in buildings of this type. In Table 2, the type or occupancy of

the different buildings are listed in the first vertical column. The second row of vertical columns lists the class of fire in the order of probability for the particular building shown.

The third vertical volumn represents the type of hazard that is a contributing factor to the cause of fire in the building listed. Regarding the hazard tabulation, *X* is meant to signify common hazard while *Y* means special hazard and *Z* is applied to unknown hazard or cause.

The fourth vertical column typifies the basic extinguishing agent needed to effectively combat and put out the fire. The fifth vertical column lists the extra needs of fire protection that would be very helpful in combating a fire as an additional means.

How Table Works

For example, consider an office building that is included under the heading of Public Buildings. We shall now show how this table works.

The most probable type of fire in an office building is the Class A fire which originates with ordinary combustibles. The second most probable type of fire is the Class *B* which originates with electrical apparatus or equipment. The third type is, of course, the Class *C*, which originates with flammable liquids, substances or gases. the hazard most responsible for fires in this type of building is the common hazard which is denoted by *X*. The basic extinguishing agent needed for the Class *A* fire in this building is denoted by A-1. Referring to Table 1, you will note that several fire protection systems are listed under A-1. These include, outside hydrants, standpipe systems, and sprinkler systems. Since outside hydrants are normally included in the street, the engineer must decide whether he will employ a standpipe system or a sprinkler system, or both. This decision, of course, depends upon the occupancy, type of interior construction or the fire underwriters recommendations. Nevertheless, the basic system is included under A-1.

Let us suppose that the engineer has decided to use a fire standpipe system. He then has provided the basic extinguishing agent that will most effectively extinguish fires in this type of building. However, in an office building, many little fires start for which the fire hose of the standpipe system would be rather cumbersome to handle. In this instance, some small, handy extinguishing agent would be most practical. Therefore, an extra need has been listed as A-3. Again, referring to Table 1, you will note a number of units that are listed under this category are very suitable for handling small fires. A CO_2 hand extinguisher would serve the application well. The engineer must select the particular unit he feels will most adaquately serve the purpose and then include in his design, the locations where these units shall be placed. Often, when a fire standpipe system is used, a hose cabinet is utilized and the hand extinguisher is contained in this cabinet along with the hose. It is a much safer practice to include a number of hand extinguishers in the corridors of the office building in specific locations where they are handy for the small fires that might start in the office spaces.

Another Application of Table

Another example of the manner in which the table works is to show the tabulation for a chemical plant which is included under Manufacturing. Here a Class *C* fire is most probable with a Class *A* and a Class *B*, next in line. Special hazard is shown by *Y* since it is the nature of the work performed in this type of building that is responsible for the greatest majority of fires that occur. The basic extinguishing agent to be used in this case is C-1 which is defined in Table 1. Referring to extinguishing agents listed under C-1 in Table 1, the engineer must select the specific agent he believes will be

(Concluded on page 154)

TABLE 2—EVALUATION OF EXTINGUISHING AGENTS

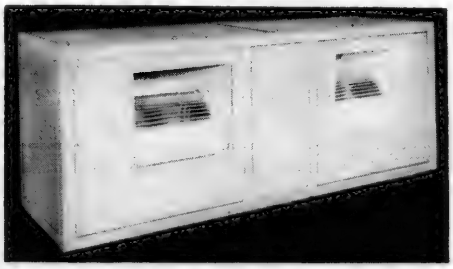
Type of Building or Occupancy	Order of Probability in Class of Fire			Type of Hazard	Basic Extinguishing Agent	Extra Needs
	1	2	3			
Dwellings						
Private residences	A	B	C	X	A-1	A-3
Apartment houses	A	B	C	X	A-1	A-3
Hotels	A	B	C	X	A-1	A-3
Motels	A	B	C	X	A-1	A-3
Jails and institutions	A	B	C	X	A-1	A-3
Nursing homes	A	B	C	X	A-1	A-3
Hospitals	A	B	C	X	A-1	A-3
Rooming houses	A	B	C	X	A-1	A-3
Dormitories	A	B	C	X	A-1	A-3
Housing developments	A	B	C	X	A-1	A-3
Public Buildings						
Schools	A	B	C	X	A-1	A-3
Office buildings	A	B	C	X	A-1	A-3
Churches	A	B	C	X	A-1	A-3
Assembly halls	A	B	C	X	A-1	A-3
Banks	A	B	C	X	A-1	A-3
Amusement centers	A	B	C	X	A-1	A-3
Museums	A	C	B	X	A-1	A-3
Clubs	A	B	C	X	A-1	A-3
Theaters	A	B	C	X	A-1	A-3
Government buildings	A	B	C	X	A-1	A-3
Mercantile						
Furniture	A	B	C	X	A-1	A-3
Shoes	A	B	C	X	A-1	A-3
Supermarkets	A	B	C	X	A-1	A-3
Paints	C	B	A	Y	C-1	A-1
Books	A	B	C	X	A-1	A-3
Department stores	A	C	B	X	A-1	A-3
Hardware	A	B	C	X	A-1	A-3
Clothing	A	B	C	X	A-1	A-3
Restaurants	C	A	B	Y	C-1	A-1
Warehouses	A	B	C	X	A-1	A-1
Manufacturing						
Chemicals	C	A	B	Y	C-1	A-1
Plastics	A	B	C	Y	A-1	A-3
Woodwork	A	C	B	Y	A-1	A-3
Metal	A	C	B	Y	A-1	A-3
Paper and pulp	B	A	C	Y	B-1	A-1
Rubber	C	B	A	Y	C-1	A-1
Paints	C	A	B	Y	C-1	A-1
Leather	A	B	C	X	A-1	A-3
Processing	A	B	C	Y	A-1	A-3
Rugs and carpets	A	B	C	X	A-1	A-2
Miscellaneous						
Garages	C	A	B	Y	C-1	A-1
Power plants	B	C	A	Y	B-1	A-1
Aircraft hangers	C	B	A	Y	C-1	A-1
Refineries	C	B	A	Y	C-1	A-1
Dry cleaning	C	B	A	Y	C-1	A-1
Research laboratories	C	A	B	Y	C-1	A-1
Lumber and coal yards	A	B	C	X	A-1	A-3
Fuel oil storage	C	A	B	Y	C-1	C-3

NEWS OF EQUIPMENT AND MATERIALS

Use the convenient prepaid postcard appearing on the last page for securing additional information about new equipment and materials described in this department.

Condensers Play Dual Role

Type BC air-cooled condensers, announced by Halstead & Mitchell, Pittsburgh, Pa., do more than condense refrigerant. These units, designed for indoor applications requiring ductwork, can do double duty by ex-



hausting hot equipment room air in summer, the company states. In winter, heat of the condenser can be kept within the building to save fuel.

Units feature the company's Turbo-Flo finned coils said to provide very high heat transfer. Available upon request for multiple-circuit usage, the condensers are normally mounted on the ceiling to save floor space.

More information? Circle Item 1, postcard, last page.

Control Center Automated

Installation of its Supervisory DataCenter in the new Queen Elizabeth Hotel, Montreal, Canada, reveals a refinement of the electronic control system manufactured by Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. As shown in the accompanying illustration, hotel-room temperatures are logged on an automatic typewriter. At right, a scanner keeps the engineer informed of temperature conditions throughout the building.

The scanner checks all key temperatures every 15 min, to make certain the operator is controlling temperature

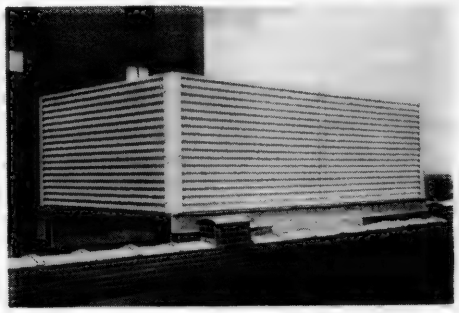
as exactly as possible, the company states. The electronic data handling system is set up on an hourly basis, but can be arranged to log for 5 or 10 min or at virtually any frequency desired. The digital clock signals when a sequence is due, sending a pulse to the programmer which signals the automatic typewriter to print the time of the log. The programmer starts the input selector switches which connect the thermocouples into the measuring circuit one by one. The voltage signal from these sensing elements is passed through a translator which converts the signal to a numerical impulse the typewriter can print.

During the logging cycle, any temperatures that are above or below the desired control points are printed in red on the log sheet. The engineer is also alerted to the needs for adjustment by the sounding of a horn and the automatic turning on of a light on the console. The engineer can then make the proper adjustment from the control room.

More information? Circle Item 2, postcard, last page.

Tower Completely Enclosed

Underflow Aquatowers, intermediate capacity, low silhouette, cooling towers that expose no louvers, fans, or piping, are introduced by The Marley Co., Kansas City, Mo. The name of these towers indicates a combination



of design, the company states, that includes cross-flow, forced draft, and double-flow. They are recommended for installations in institutions, office buildings, and other air conditioning applications where appearance, quiet operation, and operating economy are prime selection factors.

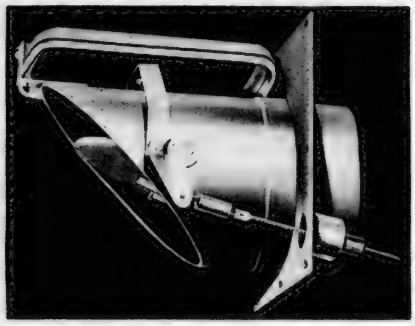
A heavy duty fan located at the bottom of the unit blows air upward into a plenum chamber where it is diverted through the filling in dual cooling areas and is then discharged vertically through air outlet openings at each end of the top of the towers. Discharging the air into the plenum chamber and passing it through the filling is said to have a natural tendency to lower the operating sound level of the towers.

Mechanical equipment is located below the cold water basin level to provide economy in piping and wiring and to eliminate ladder-climbing from routine inspection and maintenance. The completely encased design eliminates the necessity for any screening enclosures. The integral cold water basin and tower supporting structure eliminates the requirement of grillage. Four supporting piers may be located to coincide with the existing structural columns.

More information? Circle Item 3, postcard, last page.

Induction System Regulator

Cost of balancing air in high pressure induction air-conditioning systems for big buildings is said to be reduced by using an air flow regulator announced by The Trane Co., La Crosse, Wis. The device maintains a uniform air delivery from each air-conditioning unit, the



company states, and also trims installation and operating expenses of the company's UniTrane induction units. The units, with regulator, are said to be balanced even before installation.

The regulator ensures that primary air delivery to the induction unit is constant, regardless of variations in supply duct pressure. It works this way: A sensitive diaphragm controls a damper blade in the regulator to prevent fluctuations in air conditioner performance. Damper blade action is regulated by a calibrated adjustment rod which is easily set externally to determine the control point. The result is said to be maintenance of air delivery volume within 5%.

Regulator is constructed of corrosion-resistant materials and built in 3- and 4-inch sizes for either left- or right-hand air supply to conditioners.

More information? Circle Item 4, postcard, last page.

Redesigned Filter

Model B, a newly-designed Roll-O-Matic automatic renewable-media air filter that is shipped in small cartons is introduced by American Air Filter Co., Inc., Louisville, Ky. The modular design cuts installation time in half, permits easier storage on the job site, and does not require rigging for installation, the company states.

Media is reinforced for greater strength and incorporates an adhesive which will not run in high temperatures, thicken in low temperatures, nor lose its adhesive qualities due to dryness. Galvanized construction minimizes corrosion problems; new media supports which add to the structural strength of the frame and serve as media supports; an improved drive located on the service side of the unit which will serve as many as six units; maximum use of effective filtering area; an average of 12 months' supply of filtering media in a standard 65-inch roll of Roll-O-Mat.

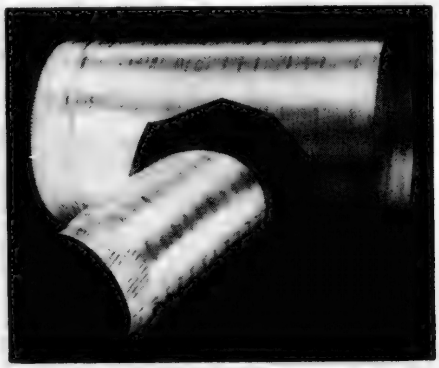
No single carton exceeds 175 lb, which is light enough for two men to handle easily.

More information? Circle Item 5, postcard, last page.

Six Duct Sealing Tapes

Six sealing tapes for heating and air-conditioning ducts are announced by Arno Adhesive Tapes, Inc., Michigan City, Ind., a subsidiary of The Scholl Mfg. Co., Inc.

The tape, tradenamed Ductape, is said to have these advantages: applies very rapidly to round and rectangular joints and transitions; needs no paste or other compound prepared in advance; costs about one-half cent



per foot; and provides positive, permanent sealing. The six types each come in 1, 1½, and 2-inch widths. Colors available are black, olive drab, tan, and aluminum (to match ductwork). Some are flame-resistant, waterproof, or vaporproof, and all have a strong, plastic-coated cotton cloth base, the company states.

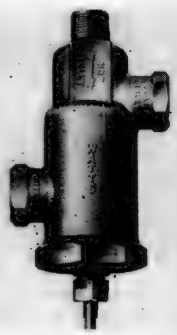
A brochure is offered which details widths, thickness, tensile strength, average adhesion, color, and the government specifications or ASTM standards to which each type adheres.

More information? Circle Item 6, postcard, last page.

Tempering Valves

Watts Regulator Co., Lawrence, Mass., announces a new line of tempering valves called the No. 171 Series.

Made in ¾ and 1-inch sizes, the valves feature a solid filled hydraulic thermostat which is said to be powerful in action but extremely sensitive and accurate.



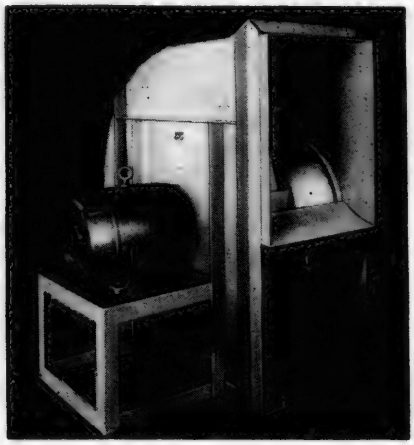
These tempering valves are especially suitable for installation on tankless heaters wherein a direct "hot" line can be piped to dishwashing or clothes appliances without seriously affecting the tempered water at domestic fixtures. Valves are adjustable from 140 to 200 deg F, the company reports.

More information? Circle Item 7, postcard, last page.

Improved Class 1 Blower

An improved, non-overloading, Class 1, direct-drive blower is marketed by The Peerless Electric Co., Warren, Ohio. Volumes range from 1,110 to 24,560 cfm. Sizes run from 12 to 36 inches.

Air enters the blower wheel through a spun venturi and passes quietly through the wheel and discharges over an



airfoil cutoff. There are no obstructions in the air inlet. Each unit is rated and tested to AMCA specifications.

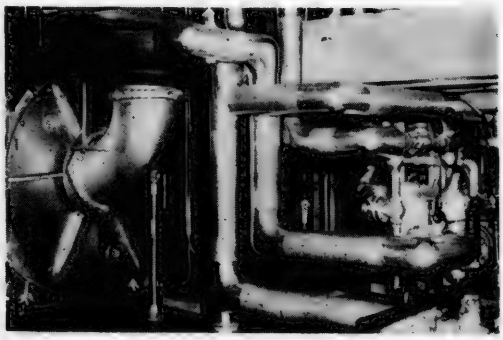
Frames and housings of the blower units are heavy-gage metal, arc welded. Wheels are welded, statically and dynamically balanced, and mounted on the motor shaft with a non-slip tapered lock bushing with keyway. Special finishes or construction are supplied for handling hot gases to 500 deg F.

The company's NEMA-rated motors are supplied, totally enclosed or explosion proof, as specified, or with higher speeds for two-speed operation. Catalog is offered with all details.

More information? Circle Item 8, postcard, last page.

Aluminum Insulation Jacketing

An aluminum elbow for jacketing insulation is manufactured by General Aluminum Supply Co., Kansas City, Mo. Containing ample space to fit both sharp or gently curving turns without cutting away insulation, the elbow's squared-off, rather than rounded, contour gives it an unusual humped appearance.

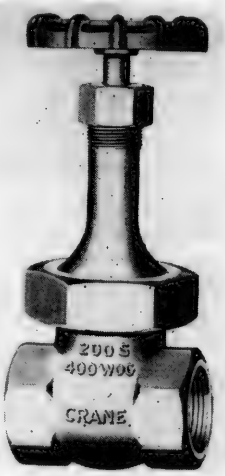


The illustration shows jacketing of thermal insulation at the new plant of The Kansas Power and Light Co., Tecumseh, Kan., where 400 of these preformed elbows, made of sheet supplied by Aluminum Company of America, Pittsburgh, Pa., were used on the steam-carrying pipelines. The elbows were installed by placing the deep-drawn halves around insulated turns, then joining them with aluminum screws. Use of the product reduced installation time and expense substantially, compared to cement and canvas jacketing traditionally applied to ells, Alcoa states. Average installation time was 9 min. per elbow.

More information? Circle Item 9, postcard, last page.

Valve Has Cylindrical Body

A newly designed line of 200-lb bronze gate valves has been announced by the industrial sales department of Crane Co., Chicago, Ill. An outstanding feature of the new valve is the modern, cylindrical body. The cylindrical body is said to provide considerably greater resistance to line distortion and internal pressure. Valves are also equipped with new, expanded-type, chromium steel alloy body seat rings. They cannot loosen in service, the company states. A wear-resistant wedge disc, which is easily replaced, is also provided.



The bronze gate valves are offered in both the rising stem and non-rising stem patterns in sizes ¼ through 3-inch.

More information? Circle Item 10, postcard, last page.

Lined Pipe and Fittings

Tube Turns Plastics, Inc., Louisville, Ky., and Swepco Tube Corp., Clifton, N. J., have jointly announced the manufacture and sale of unplasticized polyvinyl chloride (UPVC) lined fittings and pipe. The pipe will be made by Swepco; the fittings manufactured by Tube Turns Plastics, who will market both fittings and pipe.

The brand name of this pipe is Swepcore UPVC lined pipe. Both the pipe, which will normally be furnished with a steel shield, and the lined cast iron fittings, will be immediately available. Cast aluminum and cast steel lined fittings and the pipe, with aluminum, stainless steel or special alloy shielding, will be available on special order. Fittings and pipe are offered in ½ through 3-inch sizes; the size range to be extended as market requirements expand.

This type of piping is said to combine many desirable characteristics of UPVC, including high corrosion resistance, non-flammability, non-toxicity, non-aging, no electrolytic action, and smoother interior wall, with the strength of metal and improved temperature resistance. Piping systems fabricated with this combination can satisfactorily handle temperatures up to 190 deg F and pressures as high as 500 psi, the announcement states.

More information? Circle Item 11, postcard, last page.

Improved Dew Point Indicator

The Alnor 7200 is a portable self-contained dew point indicator which measures the dew point of gases over the range of room temperatures down to minus 80 deg F. It is similar to the instruments that Illinois Testing Laboratories, Inc., Chicago, Ill., has supplied for many

years, except that this model is now equipped to measure the dew point of gases that are under pressure. Therefore, the instrument is appropriate for applications on gas pipe lines, compressed air lines, instrument air lines, and bottled gas, the company states.

Use of this model avoids the necessity for hand pumping for purging and adjustment of pressure ratio. It incorporates a by-pass valve and rupture discs as safety devices to protect the instrument.

More information? Circle Item 12, postcard, last page.

Waste Disposal System

A new method in mechanized handing of waste has been developed by Conservomatic Corporation, Oreland, Pa. Called the Conservomatic System, it reduces all garbage, paper, glass, cardboard, wax containers, books, and other waste to greatly reduced (80% by volume) odorless pulp that is semi-dry, easily handled, and an effective organic mulch. No more garbage cans to haul and clean; no more corrugated cartons to pile up and take space; no more bottle disposal problems; no more quantities of waste to be carted long distances for disposal.

Basically, the system consists of a pulper, a pump and an extruder. Operation is completely automatic and controlled by pushbuttons. The pulping unit, at right in photo, powered by a 2-hp motor, is located wherever trash accumulates. Only 30 inches high, it can be installed under a scraping table in a dishroom, in a careteria, at the end of a conveyor belt, or even in a closet. All refuse is dumped into the tank. A small amount of water is added to change the waste to liquid pulp. Waste water may be used which will reduce operating costs. Where needed, several pulpers can be insalled at various locations and pipe to a centrally located extruder.

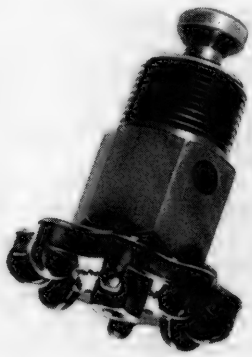
The liquid pulp is discharged through small holes that surround the bottom of the tank into a pipe connected to the extruder. If it is located some distance from the pulper, or on another floor, the liquid pulp is pumped to it. Powered by a 1-hp. motor, the extruder, at left, removes the water and pushes out the odorless pulp into a waiting container. This machine can be suspended from a ceiling or it can be installed to discharge the pulp through a window or other opening into a container outside the building. The expressed water may be recirculated to the pulper or it may pass out through a waste line into the sewer.

The unit shown will dispose of some 800 lb of garbage per hour. Operating costs are insignificant. A larger unit, designed to dispose of a ton of waste per hour, is also available.

More information? Circle Item 13, postcard, last page.

PVC Bleeder Valve

An original design bleeder valve made of corrosion-resistant polyvinyl chloride is developed by Walworth Company, New York, N. Y. The valve can be used for bleeding, sampling, or drawing off small amounts of liquid from pipe lines, duct systems, tanks, and for simi-



lar applications. It has no packing and operates in the same way as a drain cock on an automobile radiator or steam boiler.

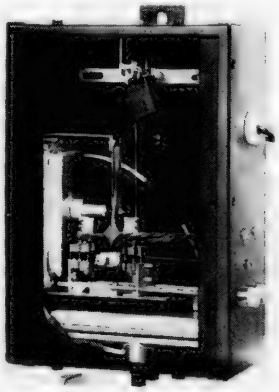
A seal formed by the back seat at the base of the valve stem is said to ensure tight closure. Left hand threading causes the valve to close when hand-wheel is rotated in the standard, clockwise direction. It has been tested successfully at pressures up to ten times recommended working pressures for PVC systems.

The valve is available in ¾-inch size with male IPS threads. It can be screwed into any female threaded ¾-inch fitting or fixture, or can be used with appropriate bushings for size adjustments.

More information? Circle Item 14, postcard, last page.

Draft Gages Indicate, Signal

Ellison Draft Gage Co., Chicago, Ill., has introduced a line of gages for indicating and controlling pressure of gas or air. They combine an indicating draft gage with one or two magnetic-type mercury switches for operating alarms or signal lights.



Company's dial pointer gage with integral alarm system is illustrated. Also available are straight line pointer gages with integral alarm system, and independent alarm system for converting existing pointer draft gages, and for other air or gas pressure operations calling for a "too high" or "too low" warning.

These gages can be used to sound an alarm or light when abnormal resistance to air filters or dust collecting systems is present; also, as an alarm system to call attention to improper high or low pressures in ducts, across air filters, and similar applications. Or, they can be used for remote control of dampers, and for starting blowers through relays.

More information? Circle Item 15, postcard, last page.

Solves Flow Problems Visually

A scientific instrument called Visu-Flo, and developed especially for the study of the behavior of air flow in two dimensions but equally applicable to hydraulics, is manufactured by Design Engineers, Rockford, Ill., under a license by Barber-Colman Company. The unit will aid designers in development of products having minimum turbulence, noise, and energy loss.

Any construction which can be cut in section, can be duplicated in model form; these models will show the

behavior of gases in motion and can provide valuable information concerning the flow of liquids. This instrument utilizes a petroleum mixture for fuel. Smoke is drawn into the console at a manually adjustable rate. Manifold pressure ejects smoke from numerous equally spaced jets, horizontally, from left to right between two heavy plates of glass. Fresh air is introduced into spaces between the jets of smoke. This procedure results in a laminated pattern of alternate jet streams, variations of which can be clearly observed and photographically recorded.

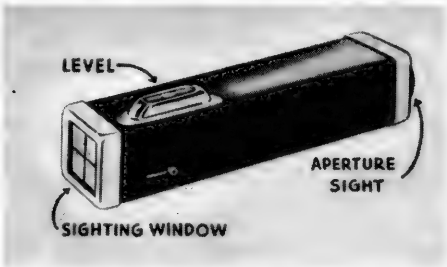
The air streams can be manually adjusted in speed, through a wide range, providing pressure feed or vacuum exhaust or any combination of both. This control system allows ready simulation of velocity change, or adjustable readability of smoke pattern.

Problem models are placed upon a clear plastic sheet and retained between the two glass plates. Smoke and air adjustments are made to provide best visibility of problems. Models are easily changed and can be stored for future use.

More information? Circle Item 16, postcard, last page.

Hand Sighting Level

A pocket-size hand sighting level is offered by Edmund Scientific Co., Barrington, N. J. Said to be accurate to within ⅓ deg, it is used like a telescope. It is manipu-



lated until bubble, reticle, and object are coincident. Priced at two and one half dollars, it should be particularly helpful in construction work, the company states.

More information? Circle Item 17, postcard, last page.

Halogen-Type Leak Detectors

A line of halogen-type, electronic leak detectors offered by General Electric Co., Schenectady, N. Y., is adaptable in almost every area of industry. A development of the type of leak detection equipment used for many years in the refrigeration and air-conditioning industry, these units will detect very small leaks in any system that contains a halogen tracer. Tracer gases, such as Freon, Genetron, and Isotron, are readily available for this purpose.

The standard unit is portable and self-contained with a multi-range indicator. A loudspeaker registers an audible alarm when the indicator exceeds a preset value as selected by means of a "cut-in" dial. Through an automatic balance circuit the detector responds only to *increases* in the amount of tracer gas present. It is explained that this feature makes it possible to detect leaks rapidly and continuously without waiting for the instrument to clear itself. It also makes it possible to locate a leak when the entire atmosphere contains some tracer gas.

More information? Circle Item 18, postcard, last page.

Six-Volt Psychrometer

A battery-powered, motorized psychrometer is added to the Tel Tru line of air testing instruments available from E. Vernon Hill & Co., Lake Geneva, Wis.

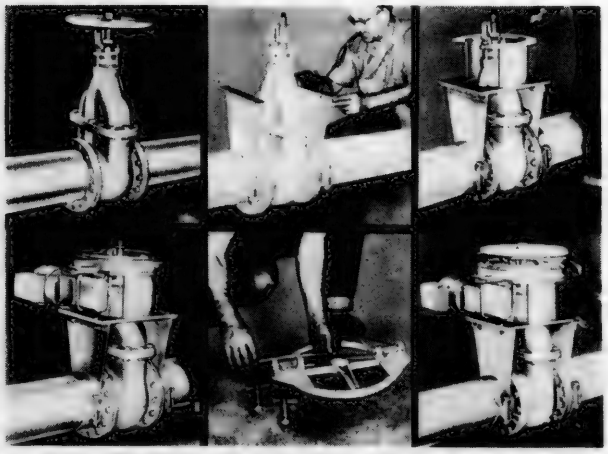
Matched thermometers have red-reading mercury behind 10-inch lens fronts. A shield behind the thermometers protect them from radiation. Powered by a 6-volt battery, the instrument's 3½-lb weight permits it to be carried anywhere. One-inch ID tubing attaches to the front for readings in ducts, filters, or hard-to-reach areas. The circular dial on the front permits relative humidity to be read off directly.

Unit features a steady aspiration over wet and dry bulb in excess of 20 fps. Price complete with 16-inch length of tubing, choice of thermometer range, battery, extra wicking, and psychrometric chart, is fifty-seven dollars and fifty cents.

More information? Circle Item 19, postcard, last page.

Conversion Unit for Hand Valves

Manufactured by C. H. Wheeler Manufacturing Co., Philadelphia, Pa., is a low-cost conversion unit for converting installed valves from hand to electric motor operation. Called Valvmatic, the unit can be used in nearly every application where the valve handle does not rise, and where the valve handle can rotate when the valve is operating under power. In the event of power failure, valve can be restored to manual operation by removing two pins.



Normal installation consists of six easy steps, as illustrated, which can be performed with ordinary tools. (1) Hand-operated gate valve is installed in line. (2) Adapter brackets are mounted to the pipe line or valve flange as required. (3) Top adapter is placed and bolted, in concentric position, to adapter brackets. (4) Actuating mechanism is bolted to top adapter. (5) Drive pin brackets are bolted to valve handwheel. (6) Final step is insertion of self-locking drive pins. After installation of local or remote electrical controls, unit is ready to operate.

More information? Circle Item 20, postcard, last page.

Variable-Area Flowmeters

Available from Fischer & Porter Co., Hatboro, Pa., are 2700 Series variable-area flowmeters which feature packing-less, snap-in metering tubes. By using O-rings to seal the tube ends to the metal fittings, nuts, bolts, stuffing boxes, packing glands, and all adjustments have been eliminated. Piping strains cannot be transmitted to the glass metering tube since the tube "floats" in the O-rings. Side frames and front and rear covers are also of snap-in construction.

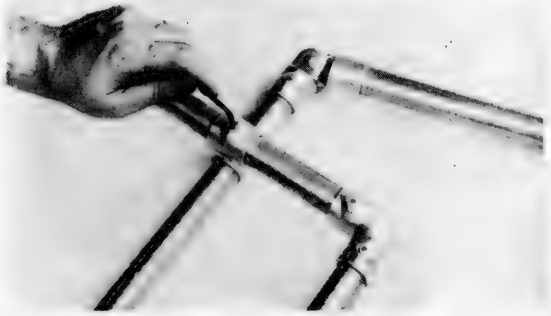
The new design permits coverage of flow ranges from a fraction of a cc per min to 40 gpm with only three meter sizes. Formerly eight sizes were required. Inventory costs can therefore be reduced 50 to 75%

Metering tubes can be snapped-in without the use of any tools, and without disconnecting or disassembling the meter. Cleaning and range changing are reduced to simple, quick routines.

More information? Circle Item 21, postcard, last page.

Aluminum Slip-On Fittings

Threading, bending, and welding of pipe for certain applications are eliminated by use of standard and swivel aluminum fittings manufactured by John H. Hosking Co., Cincinnati, Ohio. Recommended uses include railings and scaffoldings of all types, play structures, awnings, storage racks, and structural supports.

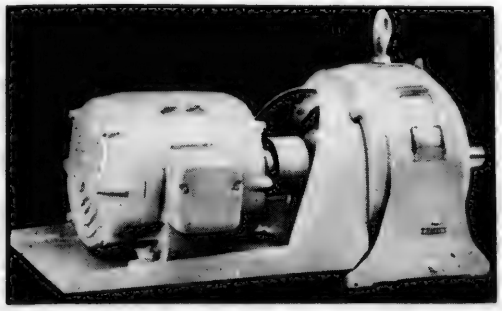


Fittings slip on pipe or tubing snugly, are tightened with a turn of the wrench. They are very durable, rustproof, and practically stress-corrosion proof, the company states.

More information? Circle Item 22, postcard, last page.

Motorized Gear Unit

The Louis Allis Co., Milwaukee, Wis., announces addition of a motorized gear unit, called Line-A-Spede, to its line of integral and right angle gearmotors. Drives are gear reducers powered by standard NEMA-frame motors mounted on a shelf attached to the reducer. Double, triple and quadruple reduction gear units, with ratios up to 1487 to 1, are available for motor ratings of 1 to 75 hp.



The unit is designed for installations where down time is critical. Motors can be replaced rapidly by disconnecting the coupling between motor and reducer. In multi-unit gearmotor installations of similar rating, stand-by protection is afforded by one stand-by motor of the largest size required.

Units are available for horizontal, vertical, flange, incline, sidewall or ceiling mounting. A backstop, to prevent reversed rotation, is optional. The gear portion is also available separately without motor or mounting shelf.

More information? Circle Item 23, postcard, last page.

Power Roof Ventilators

Manufactured by Reed Unit-Fans, Inc., New Orleans, La., for commercial and industrial applications are mushroom-type power roof ventilators in both direct and belt driven models. Line features blade diameters from 12 to

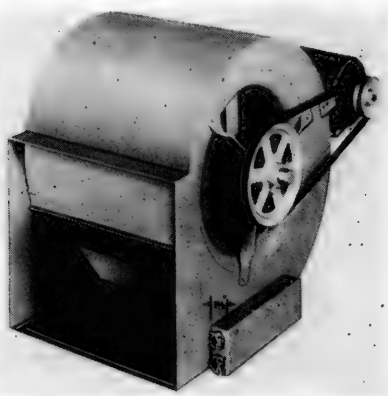
60 inches, static pressures to one-inch water gage, and air capacities to 50,000 cfm. Fan section is insulated from housing; ball bearings are used throughout.

For slight additional cost, the company offers a truly reversible ventilator which will give the same air delivery both exhausting from and pumping air into a building by taking advantage of the flexibility of the blade design. Using a maximum number of blades on the impeller, half of the blades are installed at the proper pitch angle to blow air in one direction, while the other half of the blades are installed to blow air in the other direction when rotation of the impeller is reversed.

More information? Circle Item 24, postcard, last page.

Two Air Volumes Automatically

Du-Air is a blower offered by Morrison Products, Inc., Cleveland, Ohio, which automatically switches from one to the other of two air delivery rates, one for heating and one for cooling, as signaled by a thermostat.



The shift is accomplished by a damper control mechanism, 1½ inches wide, attached to the blower housing. According to the manufacturer, the blower, with its automatic damper control, is adaptable to present systems, requires no added space, requires only one control for all installations, and is adaptable to belt and direct-drive blowers. Typical installation diagrams are offered.

More information? Circle Item 25, postcard, last page.

Heat Reflective Paint

Development of two heat-reflective paints, Plasticool NB for application to asphaltic surfaces, and Plasticool GR for application to gravel-coated built-up roofs, is announced by Coating Laboratories, Inc., Tulsa, Okla. Application of either to roofs reduces the solar load through that roof to that of an insulated north wall, the company states, because the paint reflects virtually all of the sun's rays.

Plasticool NB may be applied directly, without primer, to asphaltic surfaces such as mopped tar roofs, rolled roofing, and asphaltic shingle. It chalks slightly under weathering conditions, maintaining a self-cleaning white surface. Colors are available which are said to be nearly as heat reflective as the white.

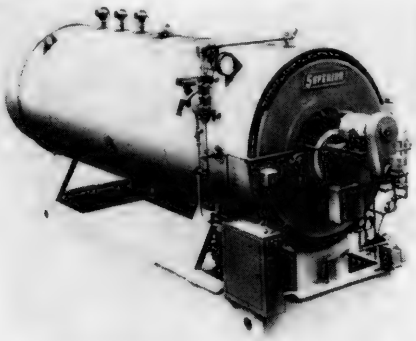
Plasticool GR has added to it a binding agent which cements gravel into position and minimizes the movement of gravel during unfavorable weather conditions. A single application is designed to cement the gravel into place on a 1-to-12 pitch roof for more than 3 years.

The paint is recommended by the manufacturer for industrial, commercial, and residential buildings to reduce air-conditioning load, and for storage tanks, farm buildings, boats, warehouses, and the like.

More information? Circle Item 26, postcard, last page.

Compact Packaged Boiler

Designing for conservation of space, reduced weight, easier handling, lower foundation loads and economy of installation through smaller openings, Superior Combustion Industries, Inc., New York, N. Y., announces the addition of a new series to its line of fully packaged boilers. Although dimensionally small, all sizes in the Compact Series have a full 5 sq ft of heating surface per boiler horsepower, and are designed around 4-pass tube arrangement.

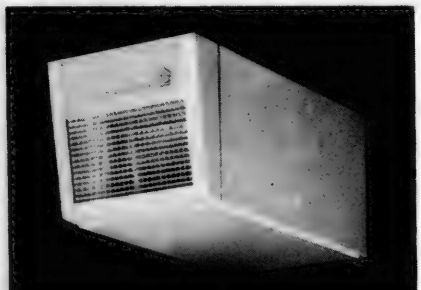


Built in 11 sizes, from 20 to 200 bhp, boiler is a complete package with burner, controls, refractory, insulation, and draft equipment installed and wired at the factory. It is factory fire-tested before shipment. Shipped on its own heavy duty structural steel base, the boiler may be set on any floor capable of supporting its weight. Following connections to fuel, water, steam, and electrical lines, and with only a simple vent for combustion gases, the unit can be in operation within 24 hr of delivery.

More information? Circle Item 27, postcard, last page.

Ceiling-Mounted Conditioners

A line of ceiling-mounted air conditioning units has been added to equipment manufactured by Air Conditioning Div., Friedrich Refrigerators, Inc., San Antonio, Texas. Designed for installation in congested building areas or where no provisions have been made for duct systems, the units have solved problems in economically



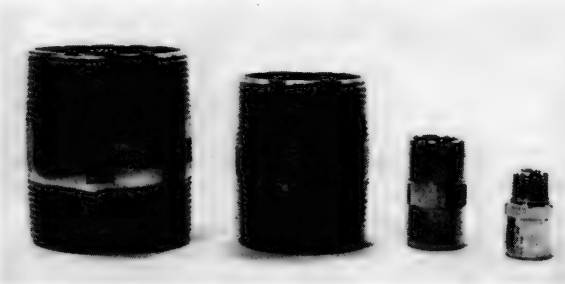
cooling such areas. Installed in combination with the company's water-saving remote air cooled condensing unit, the ceiling-mounted evaporator section is supplied in 3 basic models with cooling capacities of 31,000; 36,000; 54,000; and 83,500 Btu per hr. By having all wires and piping enter through the top panel of the evaporator, a fully concealed system is achieved. The condensate line is also hidden by having a small pump discharge the condensate up and away (an alternate gravity drain is available).

All ceiling-mounted units have a four-row evaporator coil and use double deflection-type front louvers for full directional control of the clean conditioned air. Slide-out filters can be readily changed. Fan bearings and fan motor bearings are permanently lubricated for simplified maintenance.

More information? Circle Item 28, postcard, last page.

Automatic Flow Controls

Automatic flow controls offered by Flow Control Div., Cepi-American, Inc., River Forest, Ill., are designed to control the flow of water to a specified gpm rating at pressures between 15 and 125 psi, at a temperature up to 160 deg F. Controls are manufactured in sizes to handle flows from ¼ gpm to 600 gpm.



A flexible washer which adjusts itself into a conical base, depending upon the pressure, controls the flow at a tolerance of ±5%, the company states. Standard models are available for lavatories and showers, while controls for other equipment come in ⅜, ½ and ¾ inch IPT, for use on rinse tanks, cooling water circuits, backwash controls, and spray rinse equipment. Automatic flow controls are said to be self-cleaning and will not wire draw.

More information? Circle Item 29, postcard, last page.

Packaged Chiller

A packaged water chiller designed for air conditioning and refrigeration installations in the 18- to 250-ton capacity range is developed by York Corp., York, Pa., subsidiary of Borg-Warner Corp. Chillers equally applicable to process cooling and marine refrigeration, for the chilling of brine, kerosene, machine-tool coolants, cutting oils.

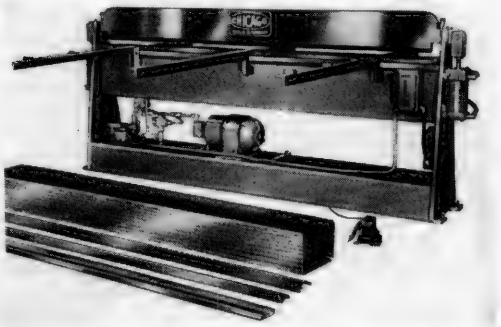
Each package has a York V/W compressor, using Refrigerant 12 or 22. Compressors are operated by a direct-connected motor, although a V-belt motor drive is also available on packages with 4- or 6-cylinder compressors.

All factory-assembled chiller units are fully wired and complete with automatic controls, as well as interconnecting piping and insulation. No field assembly is necessary other than charge-up, hook-up and start-up. Units require no special foundation and can be located easily. Spring-mounted bases assure vibration-free operation.

More information? Circle Item 30, postcard, last page.

Production Bender

To supplement its line of Chicago press brakes and bending brakes, Dreis & Krump Mfg. Co., Chicago, Ill., is offering the Speed-Bender. This machine is said to be particularly suited to production bending of heating and ventilating duct sections and similar long, light-gage work.



Bender has a capacity of 8 ft of 24-gage galvanized steel. Besides adjustable front gages, there are two disappearing pin gages in the lower die, which can be used to bend from notches in the sheet. As standard, the machine is furnished with a removable 90-deg female die having a 7/16-inch opening. The ram, also removable and adjustable, has a 1½-inch stroke and is an acute-angle male die with the bending edge induction-hardened for longer life.

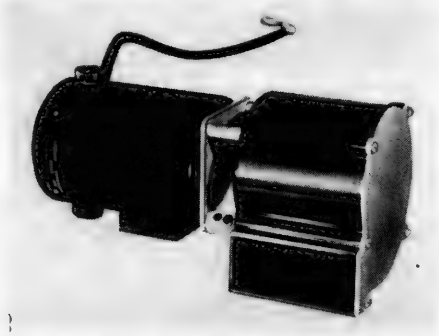
Power operation is by two cylinders and a balanced vane-type hydraulic pump driven by a direct-connected 3-hp motor. An *on-off* push-button station is mounted on front of machine. Operation of machine is controlled by a foot switch that is movable to suit operator's convenience. Approximate weight is 1800 lb.

More information? Circle Item 31, postcard, last page.

Electronic Equipment Cooling

A line of compact centrifugal air moving units for military and commercial electronic equipment cooling is available from American Blower Div., American-Standard, Detroit, Mich.

Units are available in a wide variety of sizes and arrangements to meet any electronic cooling requirement where compactness and blower efficiency are major design criteria. Several models have been specifically designed for cooling military or commercial electronic equipment, radio and TV transmitters, radar and communications sets or large electric motors. Others are applicable to such installations as mobile vehicle heat distribution systems.



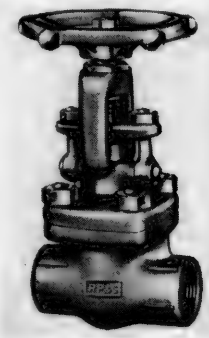
The centrifugal models are available with single or double inlets, single or double wheels, direct or V-belt drive and offset or direct discharge. A broad selection of materials is also provided in the new units.

Typical of the miniaturized models in the line is the air moving unit shown. This design measures 4 inches in diameter and is 8 inches long; it delivers 80 cfm at 1.5 inches of water static pressure. Its 1/10-hp, totally enclosed, electric-drive motor operates at 8000 rpm; weight is 5 lb. This blower will operate satisfactorily at static pressures as high as 4 inches of water.

More information? Circle Item 32, postcard, last page.

Forged Steel Globe Valve

Precision built, the Fig. F80 forged steel globe valve introduced by the R-P&C Valve Div., American Chain & Cable Co., Inc., Reading, Pa., has been designed for the process piping, power, and shipbuilding industries. Said to overcome the problems of ever-increasing temperatures, pressures, and corrosion, these valves insure longer and trouble-free life. Forged steel body, bonnet, and two-piece gland assure maximum strength and high factor of safety. Flexitallic gaskets, which are generally reusable, afford a positive and tight seal for the bolted bonnet.



These globe valves are fabricated in ¼ through 2-inch sizes with handwheel diameters of 3½ inches for the smallest to 6½ inches for the largest. Valves are subjected to hydrostatic shell test pressures of 2500 psi and an air under water seat test of 100 psi. Pneumatic testing at 300 psi can be specified.

More information? Circle Item 33, postcard, last page.

Air-Operated Sump Pump

Model 51-T, compact sump pump, designed for the low-head pumping operations of contractors, utilities, and industrial plants, is developed by the contractors' tools division of Thor Power Tool Co., Chicago, Ill.

Weighing 35¾ lb, the air sump pump drains 200 gpm from tanks, excavations, ditches, sewers, basements, man holes, and other shallow operations. Non-clogging design makes the pump especially suitable for removing clean or dirty water, sewage, oil, sludge, and other fluids.

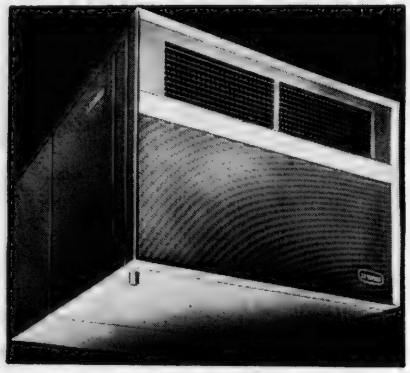
Pump is powered by a 4-blade rotary air motor that runs with less than 50 cfm of compressed air under full load. The pump is available in special non-sparking bronze models for pumping corrosive, inflammable, or other liquids in chemical and refining plants.

More information? Circle Item 34, postcard, last page.

Ceiling-Mounted Conditioners

Self-contained, water-cooled, ceiling-mounted air conditioners in 5 and 8-ton capacities are announced by Typhoon Air Conditioning Co., Brooklyn, N. Y., a division of Hupp Corporation. They are designed for installation in retail stores, factories, restaurants, etc.

A major objection to ceiling-mounted air conditioners



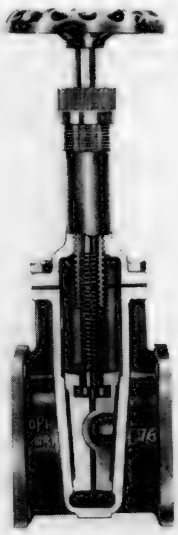
is removed with a service feature that permits one man to exchange a compressor, if necessary, in one hour without rigging, ductwork disconnections, or removal of the unit from the ceiling. The compressor is so installed so that a special hoist, available from Typhoon, can be attached to the cabinet to lift and lower the compressor.

Cabinets for both models measure 57 inches long, 44 inches wide, and 32 inches deep. Units are available for either free-throw air distribution or for connection to ductwork.

More information? Circle Item 35, postcard, last page.

Nylon Disc, Aluminum Body

Announcement of a 3-inch aluminum gate valve with a nylon disc is made by Jordan Corp., Cincinnati, Ohio, Division of OPW Corporation. The combination of the two materials, the company asserts, has resulted in a unit that weighs only 7 lb, that will seal better under adverse conditions of dirt and grit, that can be used for throttling of flow without damaging sealing qualities, and is less expensive to produce. Further, seat rings are eliminated, electrolytic corrosion, due to dissimilar metals, is eliminated, corrosion resistance is increased. and capacity per given size is greater than that of a globe valve.

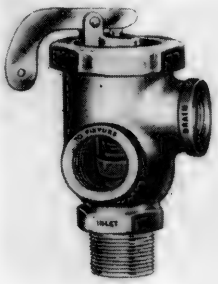


Aluminum offers much lighter construction, the company explains. However, aluminum rubbing against aluminum almost certainly leads to galling. Wedging of bronze against aluminum is also unsatisfactory. The common solution, use of bronze discs and seat rings, means additional parts, increased cost, and greater possibility of leakage. Also, sand or grit, present when the valve is closed, will mar the bronze surfaces, and throttling of high velocity flow will cause erosion of the disc material. Thus, the nylon disc.

More information? Circle Item 36, postcard, last page.

Temperature Relief Valves

A. W. Cash Valve Mfg. Corp., Decatur, Ill., announces a series of temperature-only automatic relief valves. Designated the Type TR series, they provide temperature protection for hot water tanks and heaters already protected by a pressure-only relief valve, since both pressure and temperature protection are necessary to prevent explosions. Some codes and individual preferences call for two separate valves.

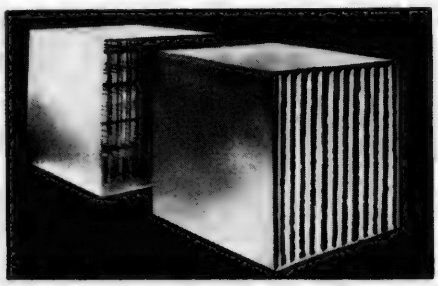


Valves are constructed of bronze casting with brass internal parts, silicone seat disc, and a positive acting thermostat which opens the valve at 210 deg F, and closes it at 180 deg. Maximum pressure is 150 psi. Available in eleven models, all AGA listed, valves meet Type 2 requirements of Military Specification MIL-V-13612 as amended.

More information? Circle Item 37, postcard, last page.

High Velocity Air Filter

A high-efficiency, high velocity air filter is announced by Cambridge Filter Corp., Syracuse, N. Y. An increase in the depth to 24 inches of the unit, as opposed to the 12-inch depth of its standard Aerosolve filter results in a



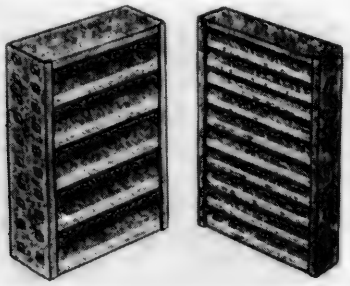
decrease in filter area of 45% at no increase in final pressure drop and for the same quantity of air. For a given duct area, air volume can be increased 80%, the company states.

Like the standard unit, this unit consists of a permanent cadmium-plated steel frame which contains a completely assembled, replaceable filter cartridge. Three interchangeable cartridges, with different filtering media are available providing efficiencies of approximately 95, 85 or 35% based on the discoloration (blackness) test using atmospheric dust.

More information? Circle Item 38, postcard, last page.

Louver Fabricating Rails

Announced by Cain Manufacturing Co., Birmingham, Ala., are coiled metal strips, tradenamed Louverail, which provide a quick and economical method of fabricating removable, hinged, or stationery louvers. Use of the product eliminates layout, tab cutting, hole punching, riveting, and spot welding.



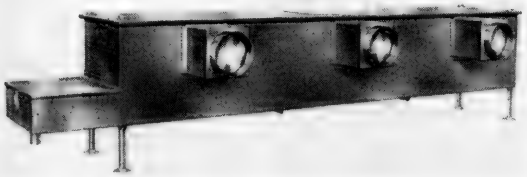
The 24-gage galvanized rail is 4½-inches wide, and can be used to make louvers with thicknesses from 3¼ to 4 inches. Split in half, the rail will make louvers from 1¼ to 1¾-inches thick.

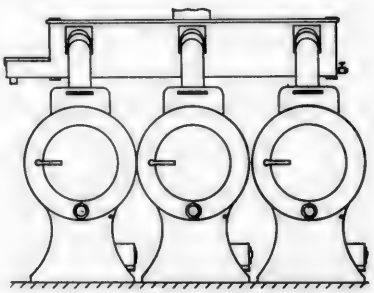
Two 50-ft lengths of the rail (one left and one right rail) are coiled together in a dispenser-type carton. Button indentations are slotted to hold louver blades which are simply peened with a hammer for a finished unit. Instructions and chart provided show louver blade stretch outs for seven different louver thicknesses.

More information? Circle Item 39, postcard, last page.

Water-Operated Lint Trap

Elimination of a fire hazard and a neighborhood nuisance, plus maintaining maximum drier efficiency, are claimed for the Olson water-operated lint trap acquired by Laundry Equipment Div., Techtmann Industries, Milwaukee, Wis.





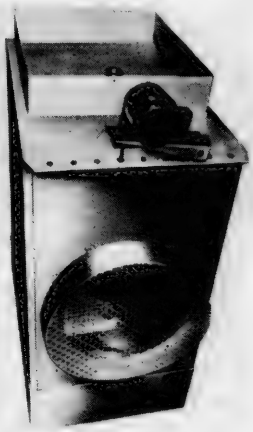
Lint removal of 95% plus was reported by laundries, dry cleaning plants, hospitals and institutions who installed the earlier model several years ago, the company states. The new model incorporates important engineering and design improvements, and is constructed of heavy-gage galvanized steel.

Based on the fact that water-trapped lint will not burn or fly, the lint-laden air from the driers comes in contact with water in such a manner that the lint is trapped in and removed by water. The lint-free air is then vented directly to the atmosphere, thus eliminating danger of fire in roof-type screen houses—and the nuisance of dry lint littering the neighborhood. Wet lint is collected in removable perforated galvanized basket at end of trap; cleaning requires only a matter of minutes.

More information? Circle Item 40, postcard, last page.

Induced-Draft Towers

A line of induced-draft water cooling towers for use with commercial and industrial air conditioning systems and especially designed to occupy minimum floor space is introduced by Mason Products, Inc., West Concord, Mass.



Designated the Hydra-Glide line, the towers are available in capacities from 8 to 75 tons. The 8-ton unit, Model 3108, operates in 10.2 sq ft of floor space, while the 75-ton tower, Model 3175, functions in 47 sq ft. Each is pre-assembled at the factory. Slip-fit type joints used in the tower casing are designed to simplify disassembly at the installation site by eliminating numerous fastenings. All casings are fabricated of fully-reinforced, heavy-gage steel.

The towers have as standard equipment a long-lasting plastic coating, venturi-type fan throat, drift eliminators, stainless steel fan shaft, and overflow and drain fittings. Maintenance time is said to be considerably reduced by just one grease point. As other service features, an open-type distribution box is used to facilitate cleaning and inspection, and the motor is located above the fan and out of the humid air stream.

More information? Circle Item 41, postcard, last page.

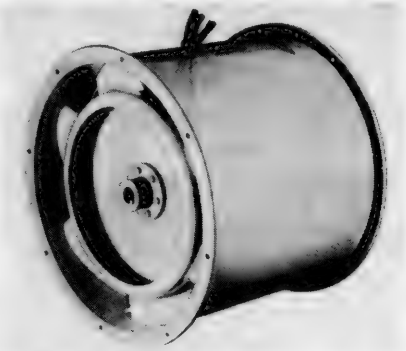
Motors for Fan Drives

Single-phase motors for fan drives are offered by Electric Motor Div., A. O. Smith Corp., Tipp City, Ohio. The line is said to fit the needs of air moving equipment manufacturers requiring motors in the ⅓ to 3-hp range. All models have terminal boards for ease in connecting line leads on product assembly lines. Also, motors are wound for rotation in either direction. Quiet operation is provided by dynamically balanced rotors, thorough ventilation, and molded Neoprene rings on bearing hubs that isolate motor and fan from motor mount.

More information? Circle Item 42, postcard, last page.

Miniature Vaneaxial Blowers

A line of small, compact vaneaxial air moving units for electronic equipment cooling and other blower applications where space is critical is available from American Blower Div., American-Standard, Detroit, Mich. The line can be furnished in a wide variety of housing shapes, sizes, flange designs, finishes and mounting arrangements.



All can be designed to meet military specifications. Included are both single-stage and two-stage units. All are direct-drive with integral electric motor.

One single-stage blower in the line, for example, is a unit designed specifically for cooling electronic equipment and inflating military radomes. Rated at 7/8-hp at 5600 rpm, the 11 x 11¾-inch package delivers 700 cfm of air at 4.0 inches of water static pressure.

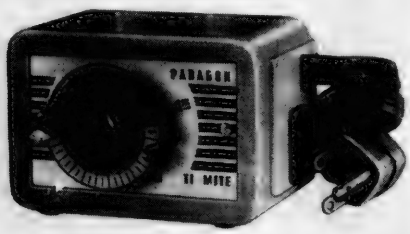
Typical of two-stage units is the 2¼-hp blower (illustrated) designed for high pressure, low volume performance suitable for cooling Magnatron tubes in radar sets. Although measuring but 11½ inches long by 14¼ inches in diameter, this design can deliver 400 cfm at 19.0 inches of water.

More information? Circle Item 43, postcard, last page.

Window Air Conditioner Timer

An air conditioner timer, Model AC1-0 Ti-mite, is announced by Paragon Electric Co., Two Rivers, Wis. It is a plug-in type designed for use with window air conditioners. Set like a clock, it works on a 24-hr schedule.

Greatest advantage of the timer is that unlike a thermo-



stat, it does not operate during off occupancy periods. It can be set to pre-cool the room in advance and to turn off the air conditioner after normal occupancy hours. A manual *on* lever permits operation during automatic *off* periods.

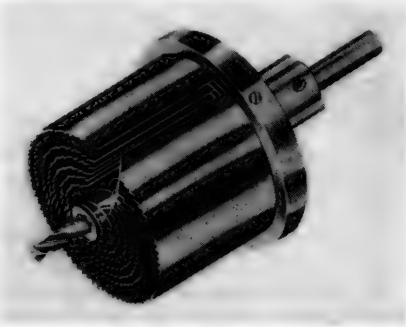
The unit is provided with a 5-ft, 3-wire air conditioner cord with 3-wire grounded plug. Four non-mar rubber feet are provided for flat surface use and two mounting holes on back plate for easy hanging.

Electrical rating: 120 volts, 60 cycle; 12 amps., full load, 1 hp. Not available at 240 volts.

More information? Circle Item 44, postcard, last page.

Heavy-Duty Hole Saws

Arco hole-saw, a new line of heavy-duty hole saws for plumbers, electricians, heating and air conditioning contractors, is announced by Arrow Metal Products Co., New York, N. Y. All models are equipped with company's slug-ejector which pops out slugs and discs automatically, thus saving labor. time.



The line is available in several models with 1 or 2¼-inch long blades. No. 630 has 5 blades to cut tap size holes for ¾, 1, 1¼, 1½ and 2-inch pipe. No. 640, illustrated, has 6 blades to cut slip-fit holes for ½, ¾, 1, 1¼, 1½ and 2-inch pipe.

Each hole saw is equipped with the highest quality metal cutting blades, guaranteed shatterproof, to saw through steel, cast iron, lumber, wallboard, plastics, and formica, company states, when powered by an electric drill. Blades slip into grooves of tool head, and are easily exchanged and replaced.

More information? Circle Item 45, postcard, last page.

Forced Air Heaters

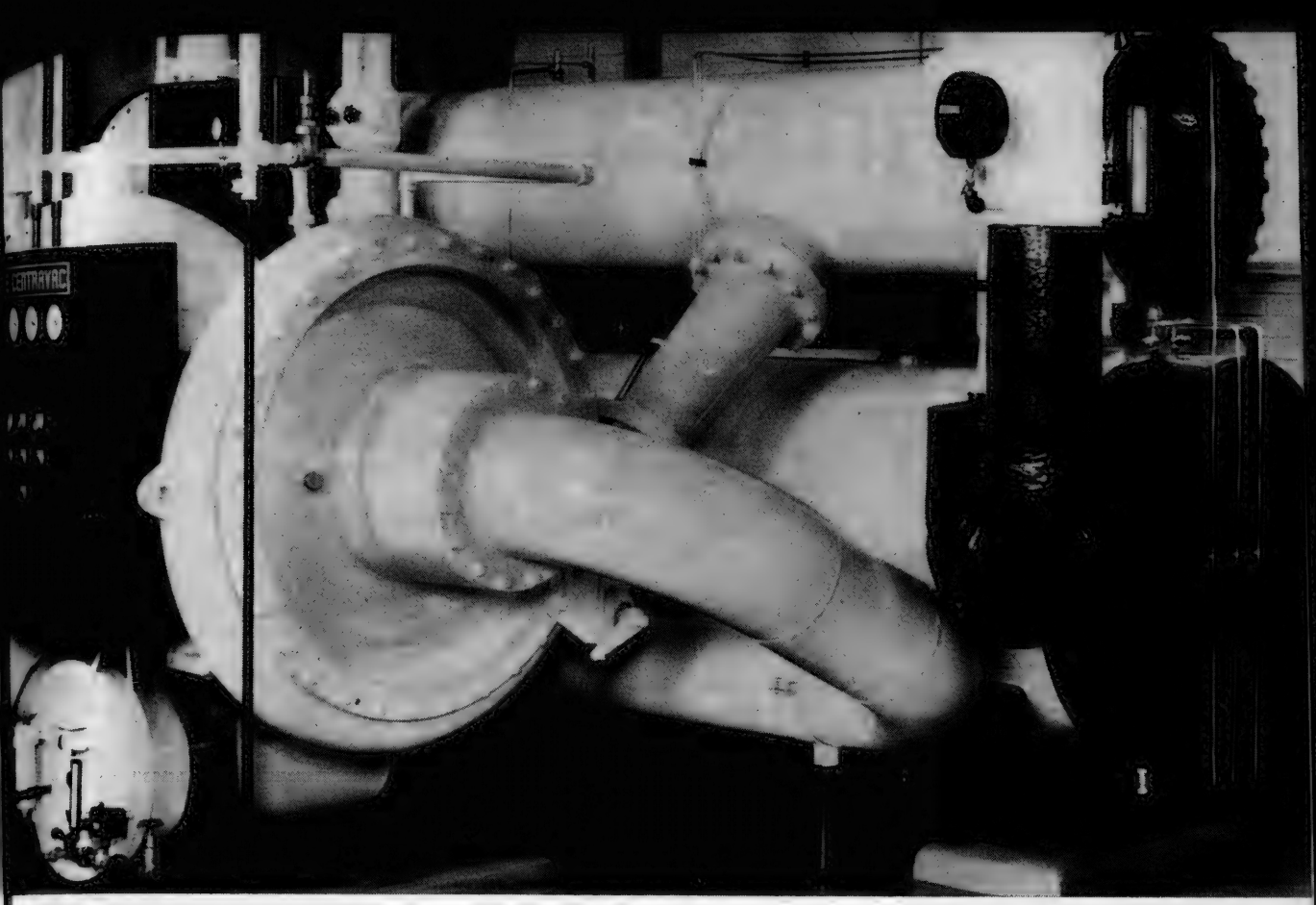
A line of heavy duty forced air heaters, ranging in capacity from 400,000 to 2,000,000 Btu per hr, is offered by Airtherm Mfg. Co., St. Louis, Mo.

Models are built with elliptical stainless steel combustion chambers, heavy duty blower assemblies, and burners capable of operating on oil or gas. All eight models can be installed on the floor, or suspended from the ceiling in horizontal or inverted position. Each type of installation can be quickly moved to a new location if desired.

Each unit is automatic in operation and factory-assembled. Safety is assured by electronic protection which insures positive shut-down in the event of power or fuel failure. All units comply with standards established by the American Gas Association and the Underwriters Laboratory.

More information? Circle Item 46, postcard, last page.

(Continued on page 114)



Thrifty Trane CenTraVac® provides chilled water at low cost

You'll cut air conditioning costs if the water chiller you select is a rugged, dependable TRANE CenTraVac.

Whether air conditioning is required for process or comfort, the CenTraVac provides the refrigeration needed, *automatically*—and it cuts power costs to the bone!

In operation, the CenTraVac paces itself to supply just the right amount of refrigeration. It automatically throttles down to within 10% of its capacity—*or even lower*—to meet part-load conditions. And it reduces power consumption in almost direct proportion to the load!

But saving is just a part of the CenTraVac story. This famous hermetic compressor has been refined and perfected to the point where it has become the standard of the industry. It's so versatile and compact you can install it anywhere from basement to rooftop—even out of doors! Units available for any big building comfort or process cooling job—in a complete range of sizes to 1500 tons. For complete facts on the TRANE CenTraVac, call your nearby TRANE Sales Office—or write TRANE, La Crosse, Wisconsin.

For any air condition, turn to

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MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

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FOR SMALLER COOLING JOBS, make it a TRANE Cold Generator. Factory pre-assembled for fast, easy installation. Just a few simple piping and wiring connections to make. Compact, efficient units in sizes to 150 tons.

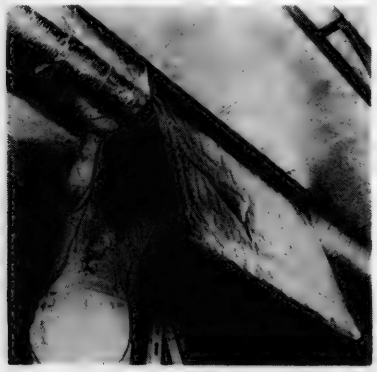
COOL OFFICES, tool rooms and other smaller areas with an economical, quiet TRANE Self-Contained Air Conditioner. Units come in a complete range of sizes from 3 to 20 tons; waterless models to 15 tons.

(Continued from page 112)

Foil-Faced Duct Insulation

Owens-Corning Fiberglas Corp., Toledo, Ohio, announces incombustible Fiberglas flexible foil-faced duct insulation designed for external application on all concealed ducts and exposed round ducts carrying cold air.

The product can be applied rapidly, because it is light



in weight and includes a flange for sealing joints, resulting in lower installation costs. The foil facing provides a tough, efficient vapor barrier.

Minimum densities range from ½ to 1 lb per cu ft, and moisture absorption is less than 2% by weight. The product is odorless, does not sustain or promote bacteria and fungus growth, and its thermal conductivity is .253 to .290 at 75 deg F.

Thicknesses are from ½ to 2 inches, widths are 24, 36, and 48 inches and lengths are 50 and 100 ft.

More information? Circle Item 47, postcard, last page.

Wall Radiation Line

Modern styling and several engineering innovations are incorporated in a line of wall radiation, called Modernline, by Fedders-Quigan Corp., Maspeth, N. Y. The hydronic units (water or steam) are designed for commercial, industrial, institutional, and multi-unit buildings.

Besides the heating element, a unit consists of only three basic components: backplate assembly, universal

pipe hangers, and cover assembly. The result is installation in one-half the time, the company states.

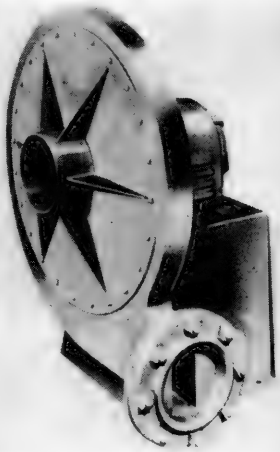
The backplate is shipped with the adjustable expansion brackets fixed in place. A lip on the top edge keeps cover ½-inch away from wall, permitting a neat paint job right up to the cover, and allows the cover to be removed without damaging the painted wall. The pipe hanger can be used with any size pipe, and swings freely to allow for expansion. The curved design of the cover is said to conform to current styling trends.

Units are manufactured in five pastel shades in baked enamel. They are available in 4-inch increments to 8 ft with or without damper. A variety of elements are offered.

More information? Circle Item 48, postcard, last page.

Turbo-Pressure Blowers

A series of turbo-pressure blowers, designed to furnish air at high pressures for use with oil and gas burners on industrial furnaces, scale blowing, and air curtains, is announced by Chicago Blower Corp., Franklin Park, Illinois.



Blowers are designed to maintain a constant pressure while supplying varying volumes of air. Their characteristic power-consumption curve is closely proportional to the amount of air used or delivered. Designed for high speed to reduce space requirements to a minimum for a given duty, the rotating elements of the blowers are light and strong. Construction of the blowers is of one type, regardless of size or pressure (from 4 to 24 oz). They operate at 3450 rpm and require 60-cycle current.

More information? Circle Item 49, postcard, last page.

Fan-Coil Units

A line of fan-coil air conditioners designed for flexible, space-saving, low-cost installations in hotels, offices, and other multi-room commercial buildings is developed by York Corp., York, Pa., subsidiary of Borg-Warner Corp.

Year-round individual room comfort conditioning is provided by a variety of compact floor, wall, or ceiling units connected into central chilled water cooling and hot water heating systems. Units are available in 200-, 300-, 450-, and 600-cfm models, and all carry Underwriters' Laboratories approval.

Positive temperature control is insured by a 3-speed fan switch and by a choice of manual, automatic self-contained, or pneumatic water controls. Outside-air louvers are available for fresh air ventilation with all floor models. Water supply, return, and drain lines are the only piping required.

More information? Circle Item 50, postcard, last page.

(Continued on page 116)

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heating specialties—
and get undivided responsibility for performance

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Use this one completely reliable source for

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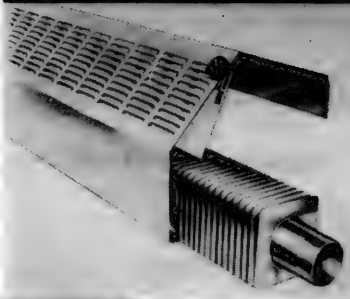
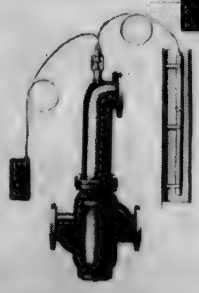
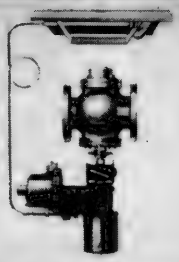
SARCOFIN FINNED-TUBE AND BASEBOARD RADIATION



SARCOTHERM WEATHER COMPENSATED CONTROL SYSTEMS



Modulating Controls for hot water and radiant heating



Modulating Controls for steam heating

Reset Controls for hot water and radiant heating

5895-B

SARCO · SARCOTHERM

635 Madison Avenue, New York 22, N. Y.

ANOTHER BIG REASON
WHY YOU GET MORE WITH A

Cordley
NEW YORK

✻ UNIFORM-PRESSURE, SPLASH-PROOF DRINKING

Bubbler jet is aimed parallel to cooler front for easy natural drinking. Ridge in stainless steel top prevents water from splashing. Volume control keeps pressure uniform, even if incoming water pressure varies.

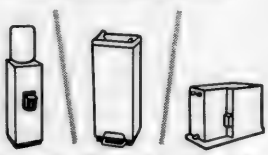
7 Features that spell value

- Dual, mechanically-operated controls—power failure does not affect water flow.
- Extra service connections—for glass fillers and remote fountains.
- Easy-to-clean pre-cooler—just a few strokes with a bottle brush.
- ✻ Uniform-pressure, splash-proof jet—for easy, natural drinking.
- Contamination-proof—refrigerant coils bonded externally.
- 7-point thermostat—maintains water at temperature most desired.
- Generous five year Guaranty—your assurance of long-term dependability.

Look for your nearest Cordley Distributor in the Yellow Pages.

Cordley Water Coolers Give You *All* The Advantages

NOW AVAILABLE IN THREE DISTINCTIVE LINES



Compact (Just 12" square) Standard Remote

There's a Cordley Water Cooler for any drinking water requirement. Write today for complete information on each model... plus data on new Cordley Hot and Cold Water Dispensers.

Ask for Catalog 58.

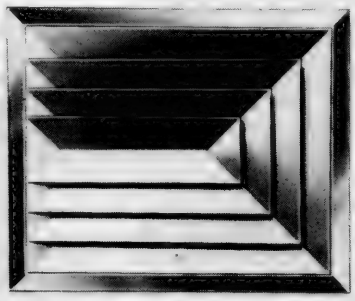
CORDLEY & HAYES
443 Fourth Avenue, New York 16, N.Y. 4825

(Continued from page 114)

New Diffuser Line

Series TMD diffusers, incorporated in a new line of square and rectangular air diffusers with built-in vane and louver arrangements that provide great versatility without baffles and blank-offs, are announced by Titus Mfg. Corp., Waterloo, Iowa.

Outlets are available in a wide variety of air patterns to suit nearly any space condition, the company says, so that they need not be centrally located in an area to



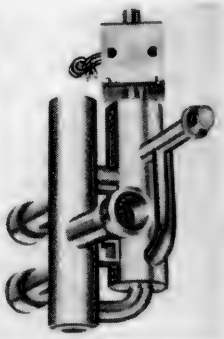
provide correct air diffusions. Designed for heating, cooling, and ventilating, and for all types of ceiling applications, they can be used also on sidewalls.

In addition to the TMD type, which is a one-piece unit, a Type TMDC diffuser is available furnished as a two-piece unit with a choice of several types of mounting frames and interchangeable cores. Further, Type TMCDR combination supply and return differs are available whose design permits the running of supply and return ducts at the same elevation.

More information? Circle Item 51, postcard, last page.

Four-Way Reversing Valve

A 4-way reversing valve for use in heat pump applications has been developed by Chatleff Valve & Manufacturing Co., Austin, Tex.



By installing this valve in the refrigerant line between the evaporator and condenser sections of an air conditioner, the unit can be readily converted to a heat pump. The valve is operated by a low wattage solenoid that may be energized by any desired relay or control.

The valve is an immediate acting type that does not require pilot valves, nor is it necessary to equalize pressures before operating. A simplified yet rugged construction assures a lifetime service of quiet, dependable operation.

Constructed of dense uniform brass throughout, the valve is hermetically sealed and equipped with Teflon valve seating. Port arrangements may be specified for production runs, as may coil voltage on any quantity.

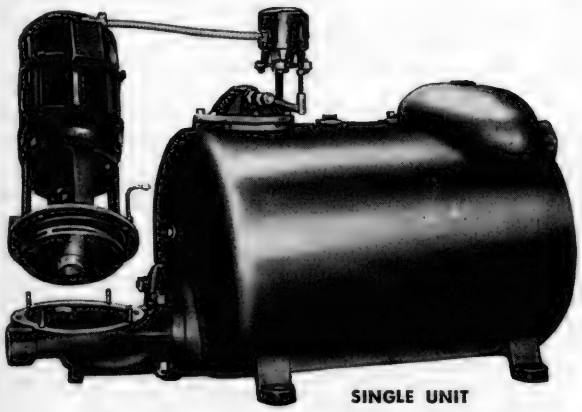
More information? Circle Item 52, postcard, last page.

(Continued on page 118)

Skidmore

SKIDMORE PUMPS have set a standard for performance and dependability since 1921

"VC" CONDENSATION PUMP AND RECEIVER



SINGLE UNIT

ACCESSIBLE FOR INSPECTION

The entire motor and pump unit may be removed for inspection or repair without disturbing piping or pipe connections. Vertical motor construction assures perfect balance and absence of vibration.

Proven Best —
BY PERFORMANCE TEST!

Dependable under all types of conditions and continual service — year after year. The Skidmore "VC" Condensate Pump will handle hot condensate to the boiler or other points from all types of steam heating or process equipment. The unit operates at a wide range of pressures. Receiver has low inlet connection. Motor is elevated and float switch mechanism is mounted on top of receiver to avoid damage from seepage or flood water.

Specify a SKIDMORE PUMP on that next job . . . there's one for every installation.

SKIDMORE PUMPS

SKIDMORE CORPORATION
ST. JOSEPH, MICHIGAN

ACCEPTED
Allen
ROOF VENTILATION

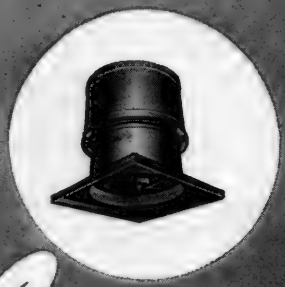
Whatever your ventilating needs, be sure to see how Allen equipment can meet your requirements efficiently and economically.

NEW "I-LINE" for EYE APPEAL

The new "I-Line" provides an attractive low contour, assuring maximum capacity or efficiency with the minimum over-all height.

POWERFUL "VD" for HIGH VELOCITY

By moving a large volume of air at high velocity, this Vertical Discharge fan keeps fumes from sifting back into building.



Allen

. . . is prepared to investigate ventilating problems and plan systems for the efficient removal of heat, fumes, vapor or dust.

WIND-DRIVEN TURBINES

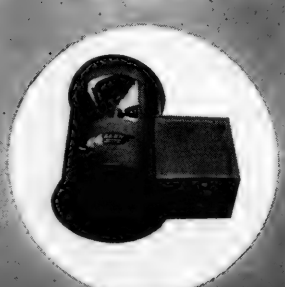
Three types of Allen turbines take full advantage of the economy of natural air movement.

EXHAUST FANS

Remote drive Staxauster is designed to handle corrosive fumes, and/or high temperature air.

THE ALLEN LINE

Write today for catalog that gives specifications and performance data on these and other units in the Allen ventilator line.

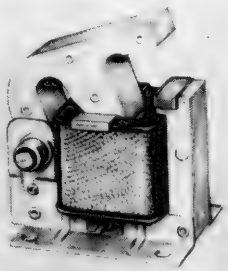


Allen
ALLEN COOLER & VENTILATOR, INC.
ROCHESTER, MICH.
Roof Ventilators for Every Commercial and Industrial Need
REPRESENTATIVES IN PRINCIPAL CITIES

(Continued from page 116)

Rotary Action Solenoid

Rotosol, a solenoid manufactured by Roto Manufacturing Co., Xenia, Ohio, is said to offer unlimited application where split-second rotary action is required. This rotary action solenoid can be energized in a-c operation for either continuous or intermittent duty. As a safety feature, it is equipped with a fail-safe thermo device. If the coil must be replaced at any time, it can be removed quickly and efficiently without removing the solenoid assembly.

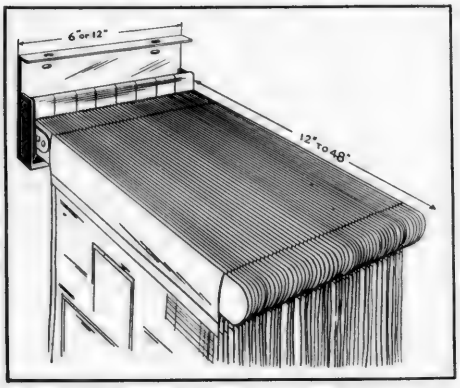


The rotary action solenoid can be designed in any size to conform to space available, and to produce the torque required to do the job better and more economically. To illustrate, the device is used to actuate rotary valves in plumbing applications, and to actuate shutter controls in ventilating and air conditioning applications. It can be used to trigger an automatic door release on large walk-in type refrigerators. An interesting application in the heating field is the use of the device as a damper control on gas furnaces; it closes a baffle over the damper opening to insure proper lighting of the furnace, and then reopens the baffle after proper lighting has occurred.

More information? Circle Item 53, postcard, last page.

Vertical File

A vertical file for *single* large sheets such as blueprints, drawings, plans, and maps is offered by Plan Hold Corp., South Gate, Calif. Each sheet is filed individually. It hangs flat and free from wrinkles or creases, ready for instant identification and use, the company

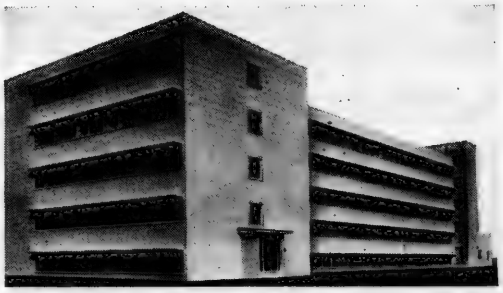


states. The file consists of a wall-mounted bracket that accommodates up to 150 aluminum hangers. By attaching Plan Hold tubular tape to the sheet, it is easily slipped on or off the hanger. In this way 150 sheets of any length can be filed in 12 lineal inches.

More information? Circle Item 54, postcard, last page.

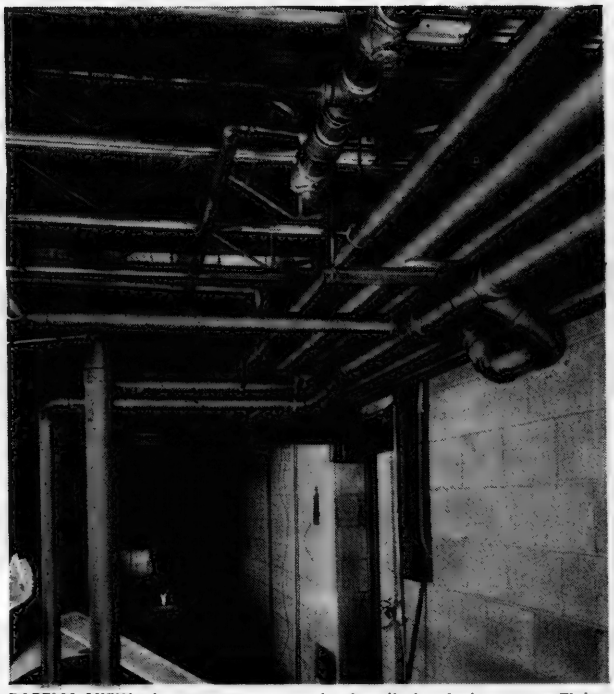
(Continued on page 120)

COPPER



simplifies plumbing in new South Bend hospital

WATER PIPING and sanitary drainage lines of copper tube between floor and ceiling. The light weight of copper tube makes overhead work like this easier and faster. Copper tube with cast-brass solder-joint fittings was used throughout the 5-story building for the sanitary drainage system.



PARTIAL VIEW of compact copper tube installation in basement. Tight working space presents no problem with copper tube and solder-joint fittings. *Architect: John N. Marx, Chicago. General Contractor: Cornelius Pitt and Company, Chicago and South Bend. Mechanical Contractor: Allied Plumbing & Heating Co., South Bend.*

A TOTAL of 7000 feet of Anaconda Copper Drainage Tube, Type DWV, in sizes from 1¼" to 6", was used in the sanitary drainage system of the new South Bend, Indiana, Osteopathic Hospital. In addition, 25,000 feet of Anaconda Type L copper tube, in sizes from ½" to 4", was used for the hot and cold water supply lines.

In commenting on the use of copper tube for the sanitary drainage system, Mr. Cornelius Pitt, President of Cornelius Pitt and Company, general contractor, said, "It just doesn't make sense to use copper plumbing for the water supply lines and another material for the piping of the drainage system.

"The light weight and long standard lengths of copper tube, and the compact, solder-joint fittings make it much easier and faster to install. This is particularly an important economy factor in roughing-in the larger sizes required for the sanitary drainage lines of a multi-story commercial or institutional building.

"Everyone concerned with the plumbing in this ultra-modern hospital building—the owners, the plumbing contractor and our firm as general contractors—are satisfied that the claimed advantages of 'ALL COPPER' plumbing are, if anything, very much on the conservative side."

Anaconda Copper Tubes – Types K and L for water supply and heating lines; Type M and the new lighter weight Type DWV for the sanitary drainage system. Anaconda wrought and cast solder-joint fittings in types for pressure and drainage applications are available in a complete range of sizes. Write for Anaconda Publication C-33. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 5753

ANACONDA®
Copper Tubes and Fittings
PRODUCTS OF THE AMERICAN BRASS COMPANY
Available through Plumbing Wholesalers

FOR LOW COST HEATING PLANT POWER-DRAFT AND INDUSTRIAL EXHAUSTING

Patent No. 2,722,372. Other Patents Pending.

...Specify

Quickdraft

★ NO MOTORS, FANS OR BEARINGS IN EXHAUST LINE ★ NEEDS NO STACKS ★ ACID RESISTING FINISHES ★ STATIC PRESSURE UP TO 20 INCHES

FOR HEATING PLANTS AND INCINERATORS, Quickdraft provides constant draft for efficient and economical combustion. It eliminates pulsating or chattering, puffing, smoking and sooting. Costly, tall and unsightly stacks are unnecessary.

FOR INDUSTRY, Quickdraft offers up to 20 inches static pressure for exhausting corrosive gases, abrasives and paint spray . . . moving fine bulk materials and wastes.

FOR MOVING AIR . . . in or out of building through ducts . . . Quickdraft is outstanding.

N-589-QD

IMPORTANT NOTICE

For withstanding corrosive gases, all Quickdraft units are available in standard acid resisting vitreous enamel, No. 316 Stainless Steel, rigid plastics (P.V.C.) and with plastic and Fiberglas coatings.

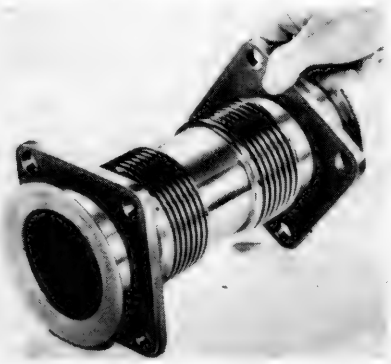
Write for QUICKDRAFT ENGINEERING DATA on your application . . . today.

Quickdraft P. O. Box 87--O
CORPORATION Canton 1, Ohio

(Continued from page 118)

Stainless Steel Bellows Assembly

A stainless steel bellows assembly with fixed flanges or straight necks in diameters from one to 6 inches is offered by U.S. Flexible Tubing Co., Bartlett, Ill. The assembly, with its separated flexible segments, provides



the flexibility required to meet all possible variants in movement occasioned by expansion and contraction, the company states.

The stainless steel bellows shown utilizes Van Stone or floating flanges and was made to order for a water and steam installation. The corrugations on each side of the center section are said to allow lateral movement in excess of current specifications.

More information? Circle Item 55, postcard, last page.

Gas Sampling, Analyzing System

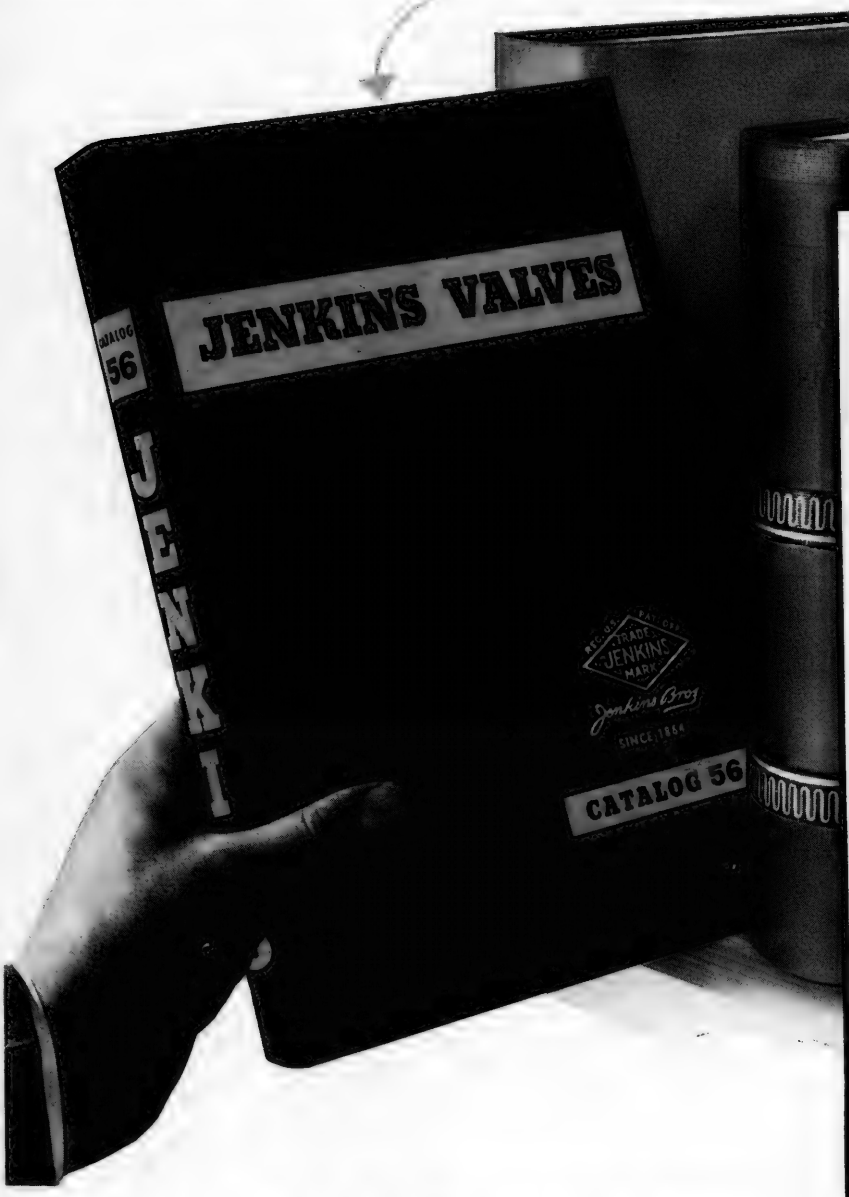
Hot, dirty exit gases up to 3200 deg F are continuously sampled, cooled, washed, and analyzed for oxygen and combustibles content by a gas analysis system available from Bailey Meter Co., Cleveland, Ohio.

This system analyzes the exit gases from all types of combustion equipment. Completely enclosed in a single compact cabinet, the system contains a gas pump, washer, separator trap, electrical switch gear, and the gas analyzer. Transfer valves are also included if multiple point sampling is required. System may be installed outdoors as well as indoors.

More information? Circle Item 56, postcard, last page.

(Continued on page 122)

DO YOU HAVE THIS HELPER?



HELPFUL FEATURES

FOUR TYPES OF INDEXES LEAD QUICKLY TO DATA NEEDED

Four-way indexing—General, Alphabetical, Fig. No., and Sectional—leads the reader instantly to the information desired, from any point of reference . . . pattern, metal, number, or function.

VALVE SPECIFICATIONS LIST ADVANTAGES AND MAJOR USES

Every Jenkins Valve in every group,—Bronze, Iron, Cast Steel, and Stainless Steel—is fully illustrated and described in detail, with an explanation of its principal advantages and uses.

HELPFUL INSTRUCTIONS FOR CHOOSING AND USING VALVES

Thirteen pages of basic information,—"Fundamentals of Valve Design and Application"—serve as a guide in selecting the correct type of valve, and provide instructions for their proper installation and maintenance to assure maximum service life.

USEFUL TABLES AND REFERENCE DATA TO WIN FAVOR OF ENGINEERS

In the 23 pages of the "Engineering Data" section, Catalog No. 56 provides a compilation of useful required tables, charts, and codes —the information wanted by the men who plan piping layouts . . . *and specify valves.*

For clear, complete, easy-to-find data on valves and how to select and use them, no other single book compares with this latest Jenkins Catalog

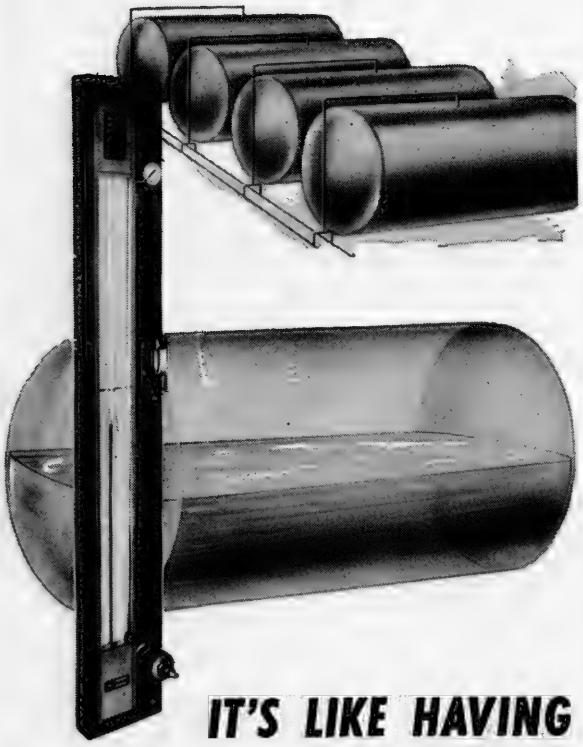
From cover to cover this 296 page general catalog of Jenkins Valves was designed to give specifiers and buyers all the data they want . . . and FAST. It's the book to reach for FIRST when you need valves or valve information. To get your copy, write (on your letterhead) to Jenkins Bros., 100 Park Avenue, New York 17.

JENKINS VALVES

LOOK FOR THE JENKINS DIAMOND

SINCE 1864 Jenkins Bros

Sold Through Leading Distributors Everywhere



IT'S LIKE HAVING TRANSPARENT TANKS

When you use

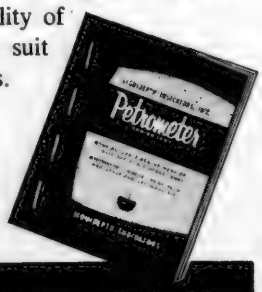
PETROMETER

REMOTE READING

LIQUID DEPTH INDICATORS

You can read the Petrometer Liquid Depth Indicator with as much confidence as if you were looking directly into your tank. It's accurate and reliable . . . operates on the principle of hydrostatic pressure.

Unique construction of Petrometer indicators makes installation easy . . . and unitized design of all working parts permits wide flexibility of multi-gauge panel design to suit your installation requirements.



Complete information is available in our Bulletin 6004. Send today for your copy.

PETROMETER CORP.

43-22 TENTH ST.

LONG ISLAND CITY 1, N.Y.

(Continued from page 120)

Plastic Insulation for Pipe

Armaflex, a recently developed, flexible, foamed plastic pipe insulation with a built-in vapor barrier, is included in the line of insulation materials manufactured by Armstrong Cork Co., Lancaster, Pa.

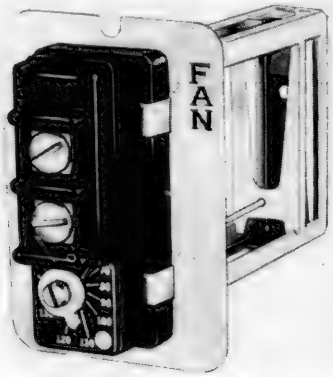
Armaflex is manufactured in nominal 3/8, 1/2 and 3/4

inch thicknesses calculated to prevent condensation on cold lines within their individual recommended usage ranges at temperatures down to 0 deg F. The insulation can also be used on heating lines, where it will withstand temperatures to 200 deg. Its closed cellular structure gives it a low k value of 0.28 at 75 deg mean temperature. It is said to resist deterioration, so that efficiency remains high in service. It is vapor impervious and physically and chemically stable, the company states.

More information? Circle Item 57, postcard, last page.

Furnace Fan Controls

Therm-O-Disc Type AF furnace fan controls are available with either a 3- or 7-inch long probe which contains the bimetal sensing element in a completely exposed position in the air stream. This "rapid response" posi-

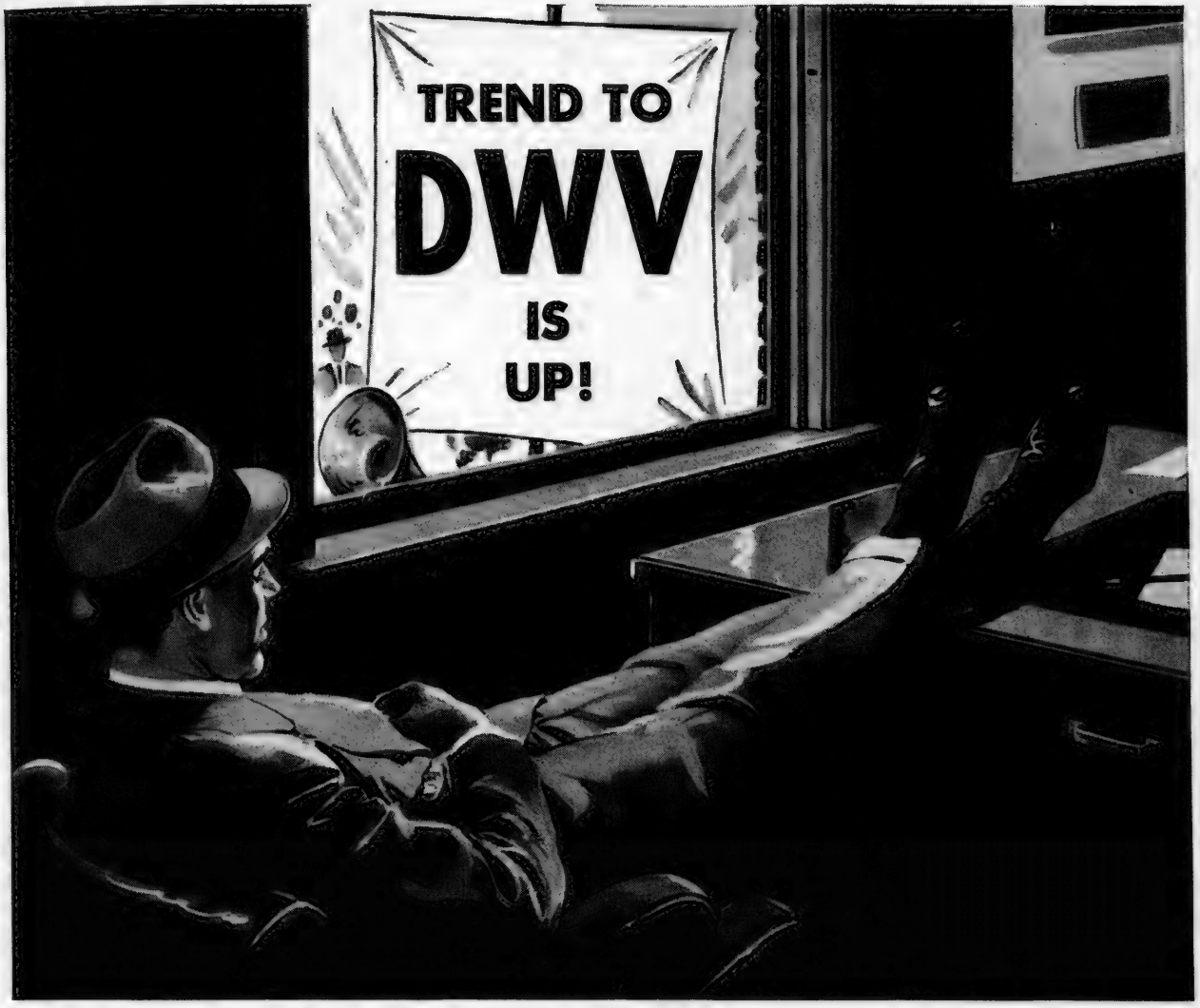


tion of the sensing element combined with a snap-acting switch mechanism is said to provide fast, efficient furnace fan control. The manufacturer is Therm-O-Disc, Inc., Mansfield, Ohio.

Unit is adjustable with a range of 90 deg F. Maximum temperature to which control can be subjected is 300 deg. Factory differential is 25 deg.

More information? Circle Item 58, postcard, last page.

(Continued on page 124)



Are You Missing The Profit Parade?

As the chart at right shows, copper drainage tube DWV is being used more and more by wide-awake contractors. Don't let this opportunity slip past you . . . ride the trend and profit. Here are the reasons for that trend:

1. Reports from contractor after contractor show installed cost to be lower than for rustable materials.
2. Every step of installation is quicker, easier.
3. Largest size in 20′ lengths can be handled by one man. Fewer hangers are required.
4. Copper can't rust . . . is virtually impossible to clog.
5. Fewer, tighter joints.
6. 3″ stack fits 2″ x 4″ wall partition.
7. Ideal for prefabrication in shop.
8. Copper is accepted by builders and owners as the badge of quality construction.

JOIN THE PROFIT PARADE NOW! SEE YOUR REVERE DISTRIBUTOR FOR SIZES AND COMPLETE DETAILS OR SEND FOR FREE DATA FOLDER

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801
230 Park Ave., New York 17, N. Y.
Mills: *Rome, N.Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N.Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.*

MADE IN U.S.A. TO THE STANDARDS OF AMERICAN INDUSTRY

IN 2 YEARS THE USE OF TYPE "M" AND DWV COPPER TUBE HAS INCREASED 29%

Size	1st Half 1955 Type M	1st Half 1955 DWV	1st Half 1956 Type M	1st Half 1956 DWV	1st Half 1957 Type M	1st Half 1957 DWV
1¼″	2.7	.1	2.1	0.5	1.9	0.7
1½″	4.6	.5	2.9	2.6	2.6	4.2
2″	1.8	.2	1.5	0.8	1.3	0.9
3″	1.8	.5	1.3	1.5	1.1	2.7
4″	0.2	**	0.2	0.1	0.3	0.3
Total	11.1	1.3	8.0	5.5	7.2	8.8
TOTAL	12.4		13.5		16.0	

Distribution expressed in lbs. per Housing Start. **Less than 0.05

Source: U.S. Dept. of Labor

Above table shows results of recent survey made by U.S. Department of Labor on the use of Type "M" Copper Water Tube and Copper Drainage Tube DWV, as determined by shipments. Note that while use of Type "M" has decreased 35%—1957 over 1955, Type "DWV" has increased a phenomenal 575% for the same period.

Easiest, *safest* way to anchor anything to concrete ceilings. Bulldogs drill in fast, *without* pressure on the hammer.

Bulldogs drill their own perfect fit. Wide expansion deep in the concrete provides the powerful Bulldog grip.

BULLDOGS

bite into concrete in seconds...

Anchor Anything Permanently!

Underwriters' Laboratories and Factory Mutual Approved

No load too great... no loosening from vibration. No drills to buy, no explosives required for fast, safe installation! Use Bulldog *self-drilling* Expansion Anchors in floor, wall, or ceiling concrete... for installing unit heaters, duct work, drain pipes, sprinkler systems, pipe supports, heater blowers, light fixtures, conduit, control boxes, machinery—*you name it!*

And one man does the job! Ask for free sample.

BULLDOG PIN BOLT DRIVES—
For anchoring in brick, concrete, tile, wood, or most any masonry block; ask for samples!... ideal for furring, window casements, conduits, awnings, convector installation.

Bulldog self-drilling Expansion Anchors are made of fire-safe, case-hardened steel with sharply machined drilling teeth. Sizes ⅜" to ⅞". Installed with electric or air hammer.

ASK YOUR DISTRIBUTOR FOR FREE SAMPLES

SEND TODAY FOR CATALOG No. 57

Complete data on Bulldog self-drilling Expansion Anchors, Bulldog Pin Bolt Drives, Toggle Bolts and accessories.

A.I.A. FILE NO. 4-H

THE GRIP THAT NEVER FAILS

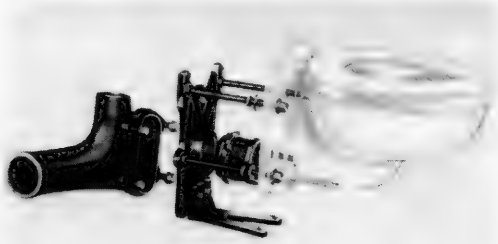
POLIS Manufacturing Co.
Division of GREGORY INDUSTRIES, INC.
2902-6 West 26th Street Chicago 23, Illinois

(Continued from page 122)

Compact Wall Closet Supports

Space-conscious restroom planners and designers may now gain additional floor space by choosing from a completely new line of wall closet supports, according to Plumbing Products Div., Zurn Industries, Inc., Erie, Pa.

The newly-designed units, called Zurn Thinline Systems, are slimmer and more compact. Radically reduced dimensions between center lines of flow and front of face plate make it possible to install, for example, the Z-1205 series



single horizontal adjustable system in pipe chase space as little as 6½ inches. Thus, building owners gain the advantage of modern, sanitary, off-the-floor fixtures coupled with the dollar-saving benefits of more usable floor space.

Other features include an offset vent connection to have time in installing flush valve piping with sufficient clearance in all directions; extra-strong diagonal ribs which guard against excess stresses and help support wall closet bowls as an integral part of the entire drainage system, completely free of finished wall; controlled-analysis lead seal which assures a watertight, dry connection between face plate and fitting; and full adjustability from the highest position on the drainage line to the lowest.

More information? Circle Item 59, postcard, last page.

Industrial Stethoscope

An industrial stethoscope made in Belgium is available from M. Paquet & Co., Inc., New York, N. Y.

Because it is non-electric and has no diaphragm, the device has no fixed frequency of its own and is reportedly capable of picking up sounds of all frequencies, and reproducing them at desired volume.

In checking parts of machinery or equipment, the operator adjusts frequency regulator for maximum amplification. The knob is then turned until all surrounding sounds are eliminated and any abnormal sounds are brought out. When the frequency of the malfunction is determined, it can be traced throughout the machine without interference from surrounding sounds.

In addition to testing machinery in operation, this device, which has interchangeable probes, can also be used for checking and detecting leaks in gas and water pipe lines, hydraulic systems and testing the soundness of castings and welded joints. An 8-page bulletin describes the stethoscope and its applications.

More information? Circle Item 60, postcard, last page.

(Continued on page 126)

everlasting

How to beat Old Debbil Time . . .

We frustrate Time . . . by forming Lewin-Mathes Seamless Tube and Pipe out of *ageless Copper* . . . heavy-walled and durable . . . smelted to meticulous purity in our own refinery.

We take Time . . . as *integrated specialists,* to test and check and analyze each step in production—from raw material to finished product—to guarantee perfect, *enduring* quality.

We save you Time . . . through a nation-wide network of Service Offices and Mill Depots, linked by Teletype, to assure *on-schedule* deliveries.

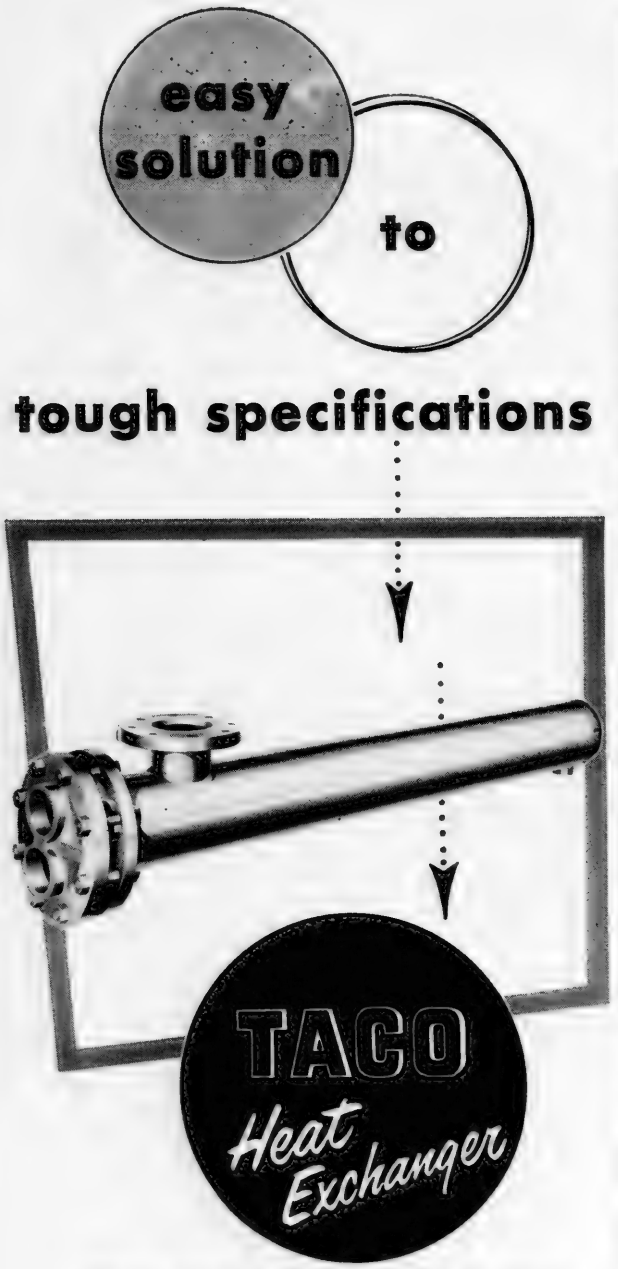
The Time *you* take to specify Lewin-Mathes for your Copper Tube and Pipe applications will be to your *everlasting* credit—and satisfaction!

LEWIN (M) MATHES

SAINT LOUIS, MISSOURI

COPPER AND BRASS TUBE PIPE AND ROD

DIVISION OF CERRO DE PASCO CORP.



Whatever your requirements — simple or complex — Taco can supply you immediately with the right heat exchanger! TACO know-how will help you select the heat exchanger you can depend upon to do the job right!

Engineered for top performance, minimum maintenance, and built to exacting standards through quality controlled manufacturing. Call or write for complete information.

Taco

HEATERS, INCORPORATED

1160 CRANSTON ST., CRANSTON 9, R. I.

Serving the Hydronic Taco Industry Since 1920

Corporate Office: 342 Madison Avenue, New York 17, New York. In Canada: Taco Heaters of Canada Ltd., 4 Gilead Place, Toronto 2

Circulator • Flochek • Air Scoop • MP Pump • 170 Pump

(Concluded from page 124)

ASA Grade A Gages

Its "A" line of pressure gages is in production at U. S. Gauge Div., American Machine and Metals, Inc., Sellersville, Pa. The models are the counterparts of the company's general purpose Series 500 with improvements in accuracy, case styles, movements, Bourdon tubes, and optional extras. Costwise, the line fits in between the company's higher accuracy Supergage line and less costly drawn steel case models.

Fields of application envisioned for the new line include power and steam plants, refrigeration systems, metalworking industries, hydraulic presses, and other industrial applications where steam, water, and non-corrosive oils and gases are the principal measured media.

The A-line gages meet ASA Grade A standards with guaranteed accuracies within 1% of scale range for the middle (working) half of scale, where readings are generally taken and 1½% of scale for the remainder. Dial sizes are 3½, 4½, 6, 8½ and 12 inches. Pressure range is from 10,000 psig down to 30 inches Hg vacuum. Compound (pressure and vacuum) ranges are also offered.

To simplify maintenance, socket, tube, tip, movement, dial, and pointer are removable as one unit (except in the 3½-inch dial size). This construction eliminates possible pointer shift due to stresses at the gage connection. It also makes it easy to remove the entire gage internals for inspection and recalibration.

More information? Circle Item 61, postcard, last page.

Tubular Centrifugal Fans

Increased capacity for large air conditioning and industrial processing installations is available in three larger sized tubular centrifugal fans delivering up to 150,000 cfm at static pressures up to 12 inches of water, introduced by Dryer Electric Corp., Brooklyn, N. Y.

Combining the compactness and connection simplicity of tubular fans with the quiet, efficient performance of scroll types, these fans have been available in 20 sizes from 9 to 60 inches and capacities from 150 to 100,000 cfm. The new sizes are: 66 inches, with capacities up to 110,000 cfm; 73 inches with capacities to 125,000 cfm; and 80 inches with capacities to 150,000 cfm.

All 23 sizes of fans may be specified for class 1, 2, 3, or 4 services. A data sheet with performance characteristics, dimensions, and other specifications in the new sizes is available.

More information? Circle Item 62, postcard, last page.

NEW PACKAGED WATER CHILLER

- **York offers the broadest range of capacities in the industry — 18 to 246 tons!**
- **Completely integrated components cut installation costs! Exclusive Flooded Cooler design cuts operating costs!**
- **Exclusive capillary oil return insures trouble-free operation at all load conditions!**

York makes news again — with a series of packaged water chillers designed to cut the costs and simplify the process of air-conditioning. These advanced units lead the field in immediate and long-term benefits both for you and for your clients:

FAST, EFFORTLESS INSTALLATION! The complete system is shipped to you on a single skid. Needs no special foundation. Most sizes can be moved through ordinary doorways. The unit comes complete with insulation, interconnecting piping, and automatic control center. To start up: just charge with refrigerant *by sight*, hook up to power and water supply — and your unit's in business.

LOW-COST, TROUBLE-FREE PERFORMANCE! These features are exclusive with York: *Flooded Coolers* and *positive refrigerant feed control* in all models assure top efficiency and maximum heat transfer over the entire range of load conditions. Positive, *direct oil return* from chiller to compressor completely eliminates the danger of interrupted flow under light loads. Automatic capacity controls save power by continuously adjusting compressor output to prevailing load conditions — without supervision.

SAVINGS IN MAINTENANCE! All components and wearing parts are readily accessible for inspection and maintenance. Tube cleaning of *both* cooler and condenser waterside is greatly simplified because all surfaces are easily reached from either end. And, of course, York's famous Certified Maintenance Service is available anywhere.

Figure for yourself the savings in dollars and manhours engineered right into this unit. It's another example of York's tradition of designing with the *real cost* of air-conditioning in mind. Consult your classified directory for the name and address of your local York sales representative . . . or write for Bulletin I-213 — which includes simplified specification tables. York Corporation, York, Pennsylvania.

YORK
CORPORATION
SUBSIDIARY OF BORG-WARNER CORPORATION

Millions Live Better with York

IN CANADA: CANADIAN ICE MACHINE COMPANY LTD., TORONTO

DEGREE-DAYS FOR APRIL, 1958

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city

AIR CONDITIONING, HEATING AND VENTILATING'S 30th Year of Publication of Monthly Degree-Day Data

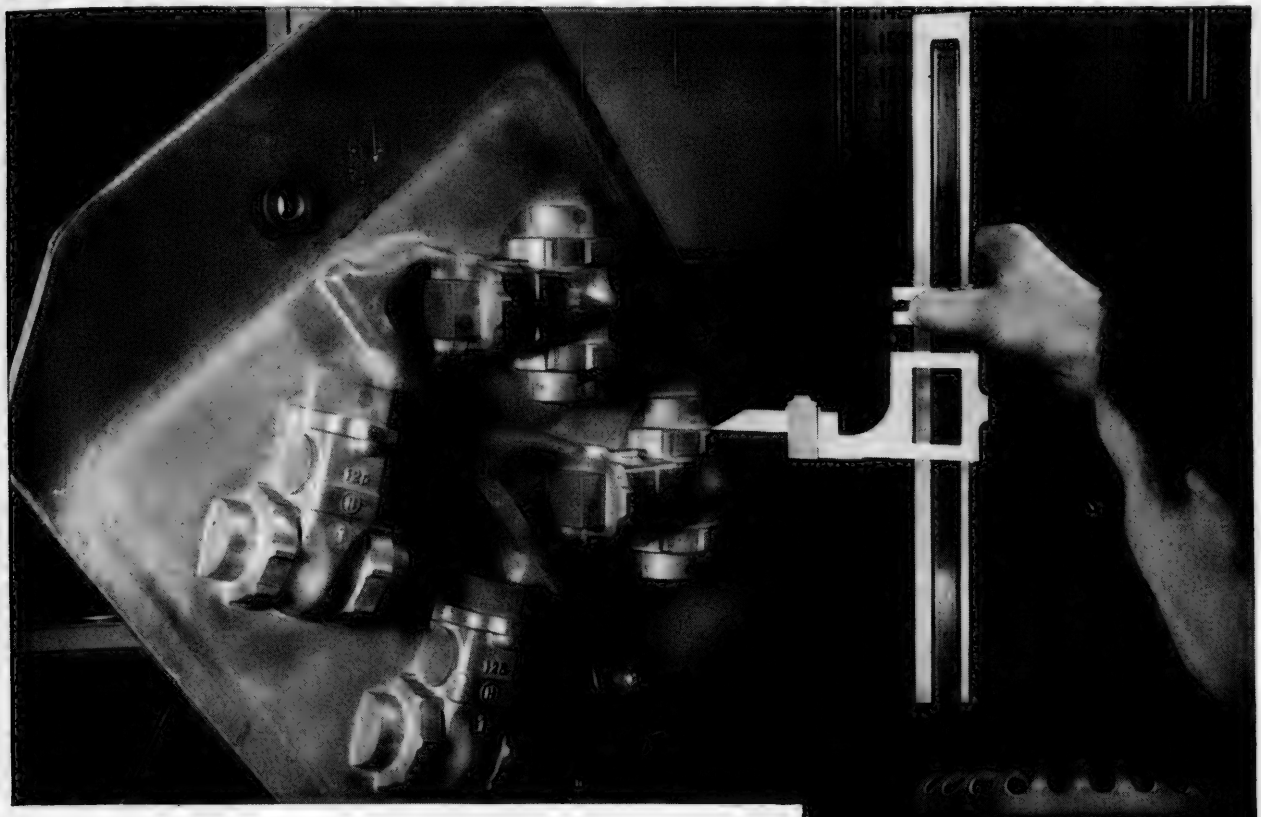
City	April			Season to Apr. 30, incl., from Sept. 1		
	1958	1957	Normal	1957-58	1956-57	Normal
Abilene, Texas (A)	160	155	113	3036	2373	2707
Albany, New York (A)	481	491	597	6256	6457	6642
Albuquerque, New Mexico (A)	354	317	289	4372	3889	4319
Alpena, Michigan (C)	666	692	762	7065	7221	7366
Asheville, North Carolina (C)	288	235	285	4656	3461	3962
Atlanta, Georgia (A)	129	109	133	3285	2209	2806
Atlantic City, New Jersey (C)	410	394	468	4525	4220	4528
Augusta, Georgia (A)	108	103	62	2917	1916	2138
Baltimore, Maryland (C)	202	240	326	3984	3671	4130
Billings, Montana (A)	601	668	564	6132	6755	6655
Binghamton, New York (C)	509	483	570	6182	5878	6232
Birmingham, Alabama (A)	116	120	128	3233	2155	2758
Bismarck, North Dakota (A)	606	692	657	7826	8400	8496
Block Island, Rhode Island (A)	537	548	603	5017	5123	5385
Boise, Idaho (A)	509	483	453	5243	5864	5549
Boston, Massachusetts (A)	481	466	534	5094	5347	5506
Buffalo, New York (A)	498	508	636	6154	5866	6405
Burlington, Iowa (A)	417	431	425	6127	5654	5888
Burlington, Vermont (A)	580	582	681	6962	7159	7420
Cairo, Illinois (C)	190	169	182	4120	3388	3709
Charleston, South Carolina (C)	75	48	43	2329	1436	1769
Charlotte, North Carolina (A)	165	123	172	3594	2575	3176
Chattanooga, Tennessee (A)	178	143	179	3863	2745	3339
Cheyenne, Wyoming (A)	774	839	717	6773	6577	6855
Chicago, Illinois (C)[b]	406	523	507	5904	(a)	6023
Cincinnati, Ohio (C)	271	288	314	4641	3921	4424
Cleveland, Ohio (A)	413	471	531	5668	5332	5727
Columbia, Missouri (A)	325	348	326	5227	4418	4958
Columbia, South Carolina (A)	113	102	77	3006	1989	2284
Columbus, Ohio (C)	360	368	408	5292	4676	5102
Concord, New Hampshire (A)	574	517	660	6367	6937	7146
Concordia, Kansas (C)	397	421	341	5477	5048	5157
Dallas, Texas (A)	108	120	75	2584	2208	2272
Dayton, Ohio (A)	401	402	435	5677	5037	5373
Denver, Colorado (A)	606	702	525	5528	5452	5765
Des Moines, Iowa (A)	445	457	438	6414	5977	6183
Detroit, Michigan (A)	457	497	558	5922	5734	6085
Devils Lake, North Dakota (C)	651	756	750	8490	9161	9301
Dodge City, Kansas (A)	439	429	347	5246	4804	4908
Dubuque, Iowa (A)	526	500	543	6971	6630	6892
Duluth, Minnesota (C)	717	786	801	8470	9042	8730
Elkins, West Virginia (A)	478	378	477	6053	4956	5456
El Paso, Texas (A)	116	102	110	2758	2210	2641
Ely, Nevada (A)	796	712	639	6921	6809	6759
Escanaba, Michigan (C)	688	737	804	7386	7695	7863
Evansville, Indiana (A)	291	258	251	4869	4103	4264
Fargo, North Dakota (A)	588	668	687	7837	8442	8769
Fort Smith, Arkansas (A)	146	181	127	3537	3041	3164
Fort Wayne, Indiana (A)	451	490	516	6071	5691	5991
Fort Worth, Texas (A)	138	142	90	2797	2356	2356
Fresno, California (A)	183	156	145	2531	2586	2489
Galveston, Texas (C)	13	32	30	1382	747	1211
Grand Junction, Colorado (A)	468	478	402	2587	5770	5628
Grand Rapids, Michigan (A)	518	539	606	6523	6147	6647
Green Bay, Wisconsin (A)	629	616	696	7457	7553	7715
Greensboro, North Carolina (A)	244	193	241	4264	3355	3760
Greenville, South Carolina (A)	175	131	161	3620	2641	3028
Harrisburg, Pennsylvania (A)	339	358	423	5189	4870	5116
Hartford, Connecticut (A)	475	482	528	5679	5934	5893
Hatteras, North Carolina (C)	(a)	(a)	171	(a)	(a)	2367
Havre, Montana (C)	574	628	597	7090	7728	7717
Helena, Montana (A)	679	679	654	6970	7692	7606
Houston, Texas (C)	18	37	27	1493	891	1276
Huron, South Dakota (A)	564	611	558	7110	7393	7517
Indianapolis, Indiana (A)	386	396	432	5683	4977	5405
Jackson, Mississippi (A)	89	114	81	2823	1878	2202
Kansas City, Missouri (A)	288	342	292	4954	4493	4769
Knoxville, Tennessee (A)	188	168	196	3959	2862	3540
La Crosse, Wisconsin (A)	484	494	552	6961	6826	7295
Lander, Wyoming (A)	712	802	687	7113	7071	7714
Lewiston, Maine (O)	643	612	693	6518	7029	7318

(a) Data not available. [b] 1958 and normal figures are for Midway Airport; 1957 figures are for Grant Park Station.

Normal figures in this table are based on 30-year period covering 1921 to 1950, inclusive, as compiled and published by the U. S. Weather Bureau.

Figures in this table, with two exceptions, based on local weather bureau reports. Exceptions are Utica and Lewiston, figures for which are furnished through the courtesy of Coke Sales Department, Central New York Power Corp., Utica, N. Y., and Norman E. Ross, Bursar, Bates College, Lewiston, Me., respectively. [Table concluded on page 130]

PREMIUM QUALITY—MODERATELY PRICED



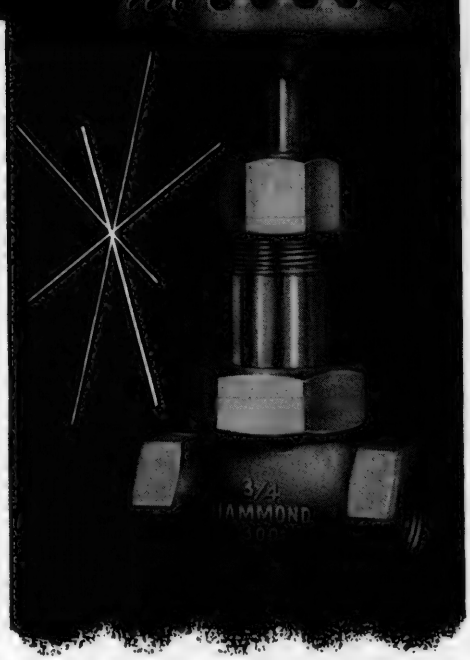
Engineered designs— over 550 of them

The skilled pattern maker above is translating another carefully engineered design from Hammond's engineering department into a new bronze valve—specifically designed to most efficiently and economically perform a particular flow control function.

The new design will be added to the more than 550 types and styles of valves which Hammond now makes. For, at Hammond, where bronze valves are our only product, they receive the undivided attention of a first-rate engineering department—are not relegated to a secondary position. As a result Hammond offers a valve specifically adapted to your particular requirements.

And the Hammond trademark on this valve is your assurance of quality second to none in the valve industry. For Hammond rigorously controls every manufacturing step from the melting of the virgin ingot to final individual testing. High volume production in a modern "automation" factory permits savings which are reflected in moderate prices for valves of outstanding quality.

A new catalog, No. 158, describes Hammond's complete bronze valve line. If you haven't already received your copy, write today to Hammond Brass Works, Hammond, Indiana.



Hammond Number 435C plug-type globe valve with 500 Brinell stainless seat and disc. Rated for 300 lbs. steam, 600 lbs. w.o.g. Similar models available in 150 and 200 lb. classes.

HAMMOND *BRITE-KOTE*® BRONZE VALVES

Degree-Days for April, 1958 (Concluded)

(A) Airport readings; (C) City office readings; (O) Readings at a point on outskirts of city

AIR CONDITIONING, HEATING AND VENTILATING's 30th Year of Publication of Monthly Degree-Day Data

City	April			Season to Apr. 30, incl., from Sept. 1		
	1958	1957	Normal	1957-58	1956-57	Normal
Lincoln, Nebraska (C)	417	438	377	5741	5340	5654
Little Rock, Arkansas (A)	132	140	122	3201	2707	2964
Los Angeles, California (C)	83	111	129	878	919	1364
Louisville, Kentucky (A)	247	264	285	4668	3984	4340
Lynchburg, Virginia (A)	289	238	289	4564	3739	4066
Macon, Georgia (A)	81	68	62	2592	1671	2049
Madison, Wisconsin (A)	545	512	573	6956	6645	6915
Marquette, Michigan (C)	672	692	789	7312	7632	7707
Memphis, Tennessee (A)	154	145	139	3582	2763	3113
Meridian, Mississippi (A)	82	107	85	2799	1871	2324
Milwaukee, Wisconsin (A)	575	598	621	6859	6638	6693
Minneapolis, Minnesota (A)	507	545	570	7054	7209	7489
Moline, Illinois (A)	435	448	453	6389	5899	6112
Montgomery, Alabama (A)	74	82	80	2598	1675	2137
Nashville, Tennessee (A)	204	175	186	4095	3063	3470
New Haven, Connecticut (A)	488	496	567	5340	5471	5695
New Orleans, Louisiana (C)	20	31	19	1555	763	1175
New York, New York (C)	364	376	456	4704	4561	4879
Newark, New Jersey	355	367	450	4802	4700	5093
Norfolk, Virginia (A)	242	173	265	3655	2925	3395
North Platte, Nebraska (A)	594	615	489	6582	6320	6227
Oak Ridge, Tennessee (C)	231	178	227	4017	2839	3970
Oakland, California (A)	226	213	282	2294	2651	2671
Oklahoma City, Oklahoma (A)	288	284	169	4115	3681	3481
Omaha, Nebraska (A)	419	431	389	5998	5614	5948
Parkersburg, West Virginia (C)	324	305	347	5065	4283	4618
Peoria, Illinois (A)	381	431	435	5938	5502	5843
Philadelphia, Pennsylvania (C)	297	326	369	4468	4110	4430
Phoenix, Arizona (A)	68	47	62	1437	1222	1492
Pittsburgh, Pennsylvania (C)	351	355	402	5159	4518	4898
Pittsfield, Massachusetts (A)	585	570	690	6764	6860	7165
Pocatello, Idaho (A)	639	616	561	6397	6736	6523
Portland, Maine (A)	630	608	693	6344	7003	7099
Portland, Oregon (C)	362	332	347	3412	4137	3847
Providence, Rhode Island (A)	509	463	570	5360	5539	5783
Pueblo, Colorado (A)	504	601	456	5198	5131	5479
Raleigh, North Carolina (A)	210	162	172	3896	3008	3046
Rapid City, South Dakota (A)	617	716	615	6436	6923	2974
Reading, Pennsylvania (C)	323	353	411	4912	4656	4921
Red Bluff, California (A)	193	173	177	2775	2525	2495
Reno, Nevada (A)	589	572	519	5484	5747	5465
Richmond, Virginia (A)	266	201	271	4244	3496	3889
Rochester, New York (A)	509	520	615	6315	6140	6477
Roswell, New Mexico (A)	226	240	185	3621	3151	3396
Sacramento, California (C)	171	152	196	2465	2419	2510
St. Joseph, Missouri (A)	349	389	297	5585	5092	4591
St. Louis, Missouri (C)	251	301	270	4736	4200	4368
Salt Lake City, Utah (A)	527	489	453	5406	5493	5552
San Antonio, Texas (A)	22	71	34	1816	1203	1579
San Diego, California (A)	79	122	151	838	956	1416
Sandusky, Ohio (C)	439	489	513	5760	5386	5601
San Francisco, California (C)	235	222	279	1998	2152	2275
Sault Ste. Marie, Michigan (A)	699	793	846	7797	8373	8517
Savannah, Georgia (A)	73	65	43	2395	1466	1710
Scranton, Pennsylvania (A)	478	485	516	6140	5968	5798
Seattle, Washington (C)	377	376	396	3408	4224	3991
Sheridan, Wyoming (A)	698	742	645	6630	7102	7287
Shreveport, Louisiana (A)	87	91	61	2468	1897	2117
Sioux City, Iowa (A)	475	498	474	6479	6300	6705
Spokane, Washington (A)	596	506	561	5630	6644	6331
Springfield, Illinois (A)	354	386	350	5574	5094	5084
Springfield, Missouri (A)	317	310	295	4850	4215	4551
Syracuse, New York (A)	496	507	570	6272	6107	6207
Toledo, Ohio (A)	465	509	555	6066	5810	6077
Topeka, Kansas (C)	311	370	295	5045	4687	4794
Trenton, New Jersey (C)	339	364	429	4812	4631	4924
Tulsa, Oklahoma (A)	194	235	173	3854	3449	3540
Utica, New York (O)	502	574	588	6614	7123	6543
Valentine, Nebraska (A)	618	673	543	6777	6896	6683
Walla Walla, Washington (C)	405	332	338	4141	5126	4639
Washington, D. C. (C)	261	241	314	4407	3813	4178
Wichita, Kansas (A)	334	360	280	4940	4478	4463
Williston, North Dakota (C)	582	718	663	7660	8346	8499
Winnemucca, Nevada (A)	620	601	546	5921	6207	5942
Yakima, Washington (A)	498	402	408	5143	6119	5580

For footnotes, see page 128.

Buensod pioneered and introduced proper controls for Dual-Duct Air Conditioning. Inherently, such systems have unstable pressures—yet provide the greatest flexibility of control for the occupants. So the problem was to make . . .

STABLE ual-duct syst n

Buensod does it automatically and without a sensing instrument or complicated electronic device. This is DIRECT, AUTOMATIC VOLUME CONTROL. No matter what the variance in static pressures, a constant quantity of air is maintained in each unit. This makes it *impossible to unbalance any zone in the system.*

And it's so simple. A screw setting of spring tension at the time of installation and the unit need never be touched again. If after installation, a change of air volume in a particular zone is desired, it can be made quickly by adjusting one nut. When desired, volume adjustment can be pre-set at the factory by calibrated flow meters, eliminating the need for field adjustment. This, in effect, balances the entire system without necessity of a field check and re-balancing.

Compressed air from a local thermostat controls the mixing valve. No linkage. No pivot points. The valve has been designed for direct, straight-line movement.

Whether you're working on a new building or a renovation, Buensod Dual-Duct air mixing units will do the job and do it best, and one of the reasons is

DIRECT, AUTOMATIC VOLUME CONTROL

BUENSOD-STACEY

BUENSOD-STACEY, Inc.

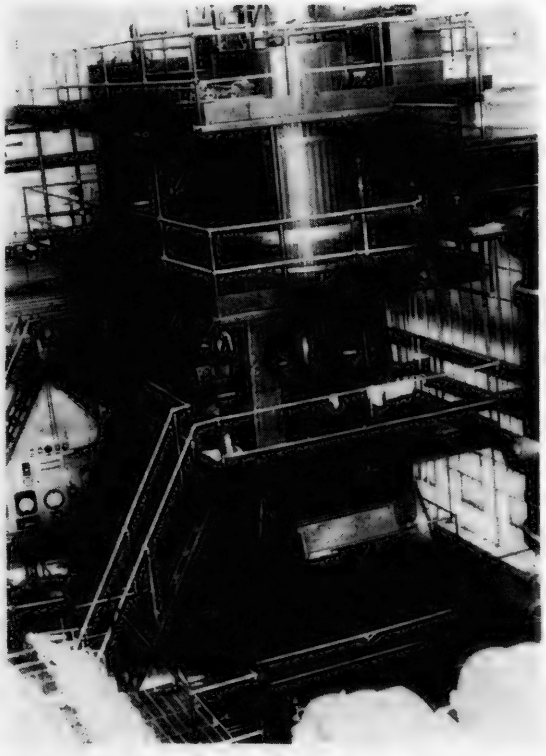
NEWS OF THE MONTH

DU PONT STUDY

sees an increase of 20% in the number of commercial-industrial cooling systems within next twelve months.

Seventy per cent of the nation's five million commercial and industrial business establishments are not mechanically air conditioned at the present time, according to a market survey report pin-pointing non-residential areas of growth for the air-conditioning industry. The survey was conducted by Freon Products Div., E. I. du Pont de Nemours & Co., Wilmington, Del.

Manufacturers of cooling equipment might well look forward to selling to about 300,000 of those establishments in the next year. That number of commercial and industrial establishments told the surveyors they plan to purchase air-conditioning equipment within the next 12 months. If those survey respondents follow through on current plans, Du Pont market analysts said, 1958 will see an increase of 20% in the number of commercial-industrial establishments equipped with mechanical cooling systems. In addition to new installations, the survey indicates, 24,000 owners of currently air-conditioned quarters plan to add to their present cooling systems within the next year, while 29,000 owners intend to replace existing equipment.



View of recently replaced "Old No. 5" steam-driven, reciprocating, ammonia compressor installed in 1916 at the Eastman Kodak Company's Kodak Park Works in Rochester, N. Y. Its successor is a three-stage turbo unit utilizing Refrigerant-12 and driven by a 2500-hp Westinghouse synchronous motor. The new 1200-ton brine chilling unit is only about 18 ft, 6 inches wide, 25 ft long, and 13 ft, 7 inches high. By comparison, the machine it replaced, having a capacity of only 480 tons of refrigeration, was 24 ft wide, 40 ft long, and 30 ft high. Both machines were manufactured by York Corp., York, Pa.

• **RETAIL POTENTIAL GREATEST**—The Du Pont study, third major air-conditioning market research project conducted by the company since 1955, is the most comprehensive study of its type ever made in the refrigeration industry. Nine basic types of commercial-industrial establishments were included in the survey, which the company said covers essentially all non-residential establishments in the nation. Separate statistics were gathered in three major areas: *Retail establishments*, including food and drug stores, eating and drinking establishments, personal-business-repair services, and all other retail; *Other commercial*, including office buildings, hotels and motels, institutions, and all other public occupancies; and *Industrial*, which includes all types of manufacturing plants and others engaged in the production and processing of materials.

So much data were developed in the survey that several months will be required for a complete analysis, but preliminary findings indicate that from a tonnage standpoint the industry's greatest sales potential exists in the retail establishment category. Based upon averages of the equipment now in use in such establishments, the 2,250,000 currently non-air-conditioned stores and shops in that classification represent a potential of about 20 million tons of cooling equipment. The approximately one million non-air-conditioned business establishments comprising the remainder of the commercial market could easily absorb 13 million tons of cooling, Du Pont estimates, while the 180,000 industrial establishments not now air conditioned could account for 1.5 million tons of new refrigeration capacity.

Even those in the currently air-conditioned class represent a sizeable potential, Du Pont market research officials pointed out, because they include many establishments which are only partially air conditioned and many in which existing equipment is subject to replacement. In the industrial area, for example, 19% of the nation's 259,000 establishments are only partially air conditioned, while 12% are wholly air conditioned. Wholly air-conditioned establishments, on the other hand, account for 29% of the 1.7 million "other commercial" establishments, and 20% of the three million retail business units.

• **USE OF PACKAGED UNITS GROWING**—The survey indicated a trend to room and package units as opposed to central systems. The smaller units, which accounted for only 24% of the installations prior to 1946, now account for about two-thirds of the total. Since 1952, according to the survey, annual installations of room units have increased about four times, while package units and other larger installations have each doubled.

Even in the larger size installations, room and package units account for a significant share of the total, and are particularly important in industrial installations. This

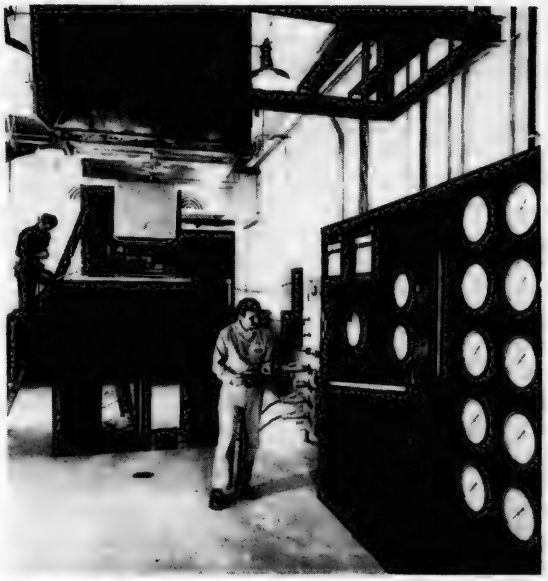
is highlighted by an analysis of air-conditioning systems totaling 50 tons or more. In the industrial field, such cooling was provided about equally by room, package, and central unit systems. In the retail store group with systems totaling 50 tons or more, room units were used in three per cent of the installations and package units in five per cent.

SPLIT FEES

condemned by Consulting Engineers Council as unprofessional conduct. Solicitation of work restricted.

High-sounding phraseology and idealistic statements are not sufficient in defining conduct for engineers when it comes to professional ethics, said the newly-elected president of Consulting Engineers Council, Charles C. Pate, of Tulsa, Okla., in an address to the Council's Second Annual Board of Directors' meeting held May 1, 2, and 3 in San Francisco, Calif. He proposed a detailed code, written in plain English, and as easily understood as the Ten Commandments, as an answer to this need.

Discussion of ethics came about as a result of a report submitted by the Council's Ethical Practices Committee. In making his report, committee chairman Joe Williamson, Jr., declared that the present lack of professional ethics in the engineering profession is widespread. The Committee recommended the following statement of policy, which was adopted by the Board:



One of the test rooms at Worthington Corporation's new packaged air conditioning research laboratory located at Ampere, N. J. Temperature and humidity controlled test rooms enable engineers to set up simulated field tests to measure the performance of fans, coils and condensers. The laboratory building consists of two main sections: 1. A sample shop that is equipped to build up complete units for testing and development; 2. Temperature and humidity controlled test rooms to measure the performance of fans, coils and condensers.

Your ideas work better when you work with HONEYWELL

The following pages bring you the latest developments in automatic controls from Honeywell. They widen your choice of products, give you more to work with.

For complete information on these new control products and systems, call your nearest Honeywell sales office. Honeywell provides 112 offices throughout the country; each is staffed with capable control specialists to assist you in preparing proposals and writing specifications.

Look over these new products and systems. And, remember, they are backed by the kind of support only Honeywell can offer you.

FOR MORE TO WORK WITH ... WORK WITH HONEYWELL

"A consulting engineer shall not share fees except with other registered professional engineers or registered architects. In no case shall so-called split fees, finder's fees, commissions, kickbacks, or other benefits be condoned. It is to be understood, however, that interprofessional practice (for example, with architects), on the basis of any recognized ethical contractual basis, is approved. Furthermore, in soliciting work, a consulting engineer shall be represented only by those individuals regularly employed by, or known to be associated with, his office."

Other business covered by the Council at its annual meeting included the acceptance of the Consulting Engineers Association of Michigan, and the Houston Chapter of the Texas Association of Consulting Engineers to full membership in the growing organization. All twenty-one members of the board of directors were present for the meeting and participated in discussions ranging from budget to unionization of engineers.

Approved by the board were resolutions providing for the acceptance of members-at-large in states or areas in which no consulting engineering association is now in existence.

Also of importance was the adoption of a California Association proposed resolution regarding procedure for answering requests for bids for engineering services.

"It shall be considered unethical practice for any member of the Consulting Engineers Council to submit a quotation for engineering services which is solicited by mail, or in any event where he has reason to believe that other engineers are being requested to submit a quotation for the same services.

"Elements considered to constitute a quotation include: Total fee, fixed fee, percentage fee (other than by reference to an established and recognized fee schedule), man-hours, hourly rates, or any combination of such elements. Replies to such solicitations shall be limited to listing technical qualifications and availability."

Plans for Past President Edward J. Wolff's attendance at the Oslo, Norway, meeting of the International Federation of Consulting Engineers were announced. Other 1958-59 Consulting Engineer Council officers seated during the San Francisco meeting were: Mr. L. K. Crawford, Springfield, Illinois, 1st vice-president; Mr. Ralph M. Westcott, Los Angeles, California, 2nd vice-president; Mr. Hueston M. Smith, St. Louis, Missouri, secretary; Mr. B. M. Dornblatt, New Orleans, Louisiana, treasurer.

LARGEST INSTALLATION

of a radiant panel ceiling for heating and cooling to be designed for largest office building in West.

The $45,000,000 Kaiser Center in Oakland, Calif., to include the largest office building west of the Rocky Mountains when completed, will have a radiant panel ceiling heating and cooling system designed by Dudley

In a restaurant application, the Honeywell "Renew-Air" Filter has high absorption capacity for such objectionable odors as tobacco smoke, burning fat, fish and others likely to be present. In the past, increased outdoor air intake was necessary to diffuse these odors, which resulted in higher air conditioning costs. Now Honeywell's "Renew-Air" Filter removes the odors, enables air conditioning to be operated economically with reduced air intake.

Deans and Associates, San Francisco, consulting engineers. To be the largest single installation of its kind in the world, it will consist of perforated acoustical tiles of aluminum, behind which a sound-absorbing blanket and pipes carrying hot and chilled water will be concealed.

• **STEAM TO WATER**—Twenty-five hundred tons of refrigeration will be required for comfort cooling for which 5,000 gpm of 45-deg F chilled water will be circulated throughout the building; 1100 bhp will indirectly heat water to a maximum of 110 deg for heating purposes. Three boilers will produce 12,500 lb of steam per hr each. Steam to water heat exchangers will be installed on every fourth floor to provide hot water for use in radiant ceiling panel grids.

A modular under-floor duct system will be used for electrical outlets and telephones. Continuous strip fluorescent lighting will be used throughout the building with fixtures recessed flush with the ceilings.

The utility plant will be located in the basement of the 28-story world headquarters for the Kaiser industrial organization which was designed by Welton Becket, F.A.I.A. and Associates, San Francisco, architects and engineers.

Worthington Corporation will supply the refrigeration equipment; Minneapolis-Honeywell Regulator Co., the comfort control system; American Air Filter Co., automatic filters; B. F. Sturtevant Division of Westinghouse, air handling equipment; Pacific Pumping Co., pumps; and Burgess-Manning, radiant panel ceiling.

CARBON WOOL

to be manufactured for odor-removing air filters. New invention is said to have wide potentialities.

Purchase of exclusive rights to manufacture and sell carbon wool, a new form of carbon said to have countless commercial and military applications, is announced by Barnebey-Cheney Co., Columbus, Ohio.

Invented by William F. Abbott, Ojai, Calif., carbon wool is described as having the following unusual combination of properties: great physical strength, non-dusting, low ash content, controllable fiber diameter, color absorption, chemical inertness and reactivity, molecular adsorptivity (when activated), resistance to high temperatures, and electrical conductivity. Still more or less in the development stage, the manufacturer admits that it does not know all the possibilities because it never had a product with this physical make-up before.

It is expected that carbon wool will be used first in air filters for odor removal in furnaces and air conditioners, and in the industrial gas mask cartridge, the company states. Another likely use would be as an insulating material in building and protective shelters to prevent entrance of toxic gases without shutting out fresh air.

For your mechanical systems . . .
Honeywell's "Renew-Air" Filters

reduce size of cooling equipment needed, pay for themselves before installation

In restaurants, stores, hotels, office buildings, Honeywell "Renew-Air" Filters can save your clients money. By reducing the amount of outdoor air intake normally required to diffuse internal odors, "Renew-Air" Filters enable you to specify smaller cooling equipment, give your clients efficient air conditioning at a lower initial cost. Savings more than pay for the cost of the Honeywell "Renew-Air" Filters themselves. In addition, client's operating costs are lowered.

And, combined with the Honeywell Electronic Air Cleaner, "Renew-Air" Filters are even more efficient. Their activated charcoal lasts and lasts because no oily smoke or film gets through to clog up the charcoal's pores. There's a bonus with the Honeywell Electronic Air Cleaner, too. It reduces cleaning and decorating costs for owners because it removes dirt particles in the air six times more effectively than ordinary filters.

"Renew-Air" Filters are available in four different sizes and types of cells, easily removable from the frame for re-activation. The Honeywell Electronic Air Cleaner is sold in "building block" modules adaptable to any installation. Call your local Honeywell office for more details.

Honeywell
First in Controls

BOOK REVIEWS

Publications abstracted in this department should be ordered direct from publisher.

ALUMINUM SHEET AND PLATE PRODUCTS

Among the most diversified aluminum products are those made from sheet and plate. Kaiser has made available in book form as ready reference for designers, engineers, and those concerned with the fabrication of such products, a sheet and plate product information book. Basic facts are presented in concise form.

In this book there are sections devoted to aluminum sheet and plate alloys; handling and storing aluminum; fabrication; joining and fastening; surface finishes for aluminum.

Sheet and Plate Product Information, second edition. Cloth bound, 5¼ x 8¼ inches, 308 pages. Published by Kaiser Aluminum & Chemical Sales, Inc., 919 N. Michigan Ave., Chicago 11, Ill. Free if requested on company letterhead.

INDUSTRIAL VENTILATION

Industrial Ventilation—a Manual of Recommended Practice has been issued by the American Conference of Governmental Industrial Hygienists. This marks the fifth edition of this important book.

This manual is intended to supply information and not to regulate practices. References are provided for those who are interested in more detailed information.

In industry, the multiplicity of health hazards as manifested by dusts, fumes, vapors, gases and mists arising into the atmosphere from the processing of industrial materials bring into even sharper focus, the importance of good ventilation practices. As with previous editions, it is expected that this manual will be of exceptional value not only to those concerned with industrial ventilation, but to all who are interested in the control of airborne contaminants in industry. It has been used as a textbook for industrial hygiene courses in many colleges and universities.

The manual has sections on ventilation principles; hood design data; hoods for specific operations; duct design procedure; make-up and recirculated air; testing of ventilation systems; fans; air cleaning devices, and an appendix of valuable data.

Industrial Ventilation—a Manual of Recommended Practice. Spiral bound, paper covers, 8½ x 11 inches. Published by American Conference of Governmental Industrial Hygienists, Committee on Industrial Ventilation, P. O. Box 453, Lansing, Mich. Price, $4.

AIR CONDITIONING AND REFRIGERATION

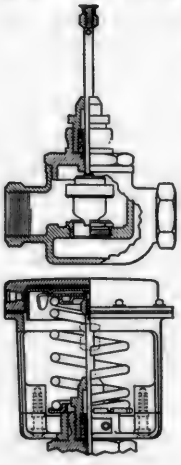
The late William H. Severns and Julian R. Fellows, both professors of mechanical engineering, University of Illinois, started work on what they thought would be the third edition of their book, Heating, Ventilating and Air Conditioning Fundamentals. However, it soon be-

For your mechanical systems . . .
New Honeywell Pneumatic Valve and Motor

FOR MORE TO WORK WITH ... WORK WITH HONEYWELL

Single seated or three-way valves available in a complete range of sizes. For more information, call your local Honeywell office.

New materials . . . new designs increase performance for control of steam or water



Valve features! Equal percentage throttling plug plus longer stroke gives better control of steam or water flow at light load.

Exclusive Teflon cone packing lowers friction, lasts longer, requires less lubrication. Easier to change because it comes out with packing nut.

Spring loaded stem and disc holder connection eliminates noise and wear, lasts longer.

Plug type throttling guide eliminates "pocking" of discs due to impingement of fluid through old V Port types.

Packing nut design eliminates periodic tightening, impossible to over- or under-tighten.

Actuator features! Diaphragm design gives more power for smaller diameter. Saves space, positions valve better, gives high close-off ratings. Larger diameter spring eliminates buckling, doesn't rub stem.

Tough Neoprene diaphragm gives longer wear, in normal temperature use. (Silicon available for extremely high temperatures.)

Quick stem-release slide makes actuator easy to remove from valve to change size or to service.

Normally open and normally closed actuators easily interchangeable. Sizes interchangeable, too.

All parts—corrosion resistant.

came evident that a new book was developing, and this is now being published as Air Conditioning and Refrigeration.

It is intended as a textbook for undergraduate courses in mechanical engineering and architecture, and is so arranged that certain chapters can be omitted to fit the specific needs of some courses.

The text is divided into 21 chapters covering such subjects as psychrometric properties of air, human comfort, heat and vapor transmission, fluid flow, space heating, heating boilers, piping details, panel heating and cooling, air conveying and distribution, ventilation and air purification, mechanical refrigeration, estimation of cooling loads, apparatus for producing cooling in summer, all-year air conditioning methods, and automatic controls.

Air Conditioning and Refrigeration, by W. H. Severns and J. R. Fellows. Cloth bound, 6 x 9 inches, 563 pages. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. Price, $10.25.

MANAGEMENT FOR ENGINEERS

A practical look at the impact of costs, standards, materials, methods, taxes, insurance, power, equipment, labor and ethics upon engineering considerations is presented in Management for Engineers, by Roger C. Heimer, associate professor of mechanical engineering, Villanova University.

Those in managerial positions have become more and more dependent upon the engineer. He, in turn, has been forced to make greater contacts with management and has had to develop a better understanding of management problems and to assume them.

It is the purpose of this book to make the engineer fully acquainted with the problems of management so that as he assumes greater management responsibilities, the thinking of the engineer will help keep business on a more even keel.

Some of the chapters in this book cover legal forms of business organization; money flow in the business enterprise; profits; production costs—standard costs; power and light; insurance; depreciation; inventory; standards; labor and equipment costs; budgets; organization in industry; communication and coordination; management decisions.

Management for Engineers, by R. C. Heimer. Cloth bound, 6 x 9 inches, 453 pages. Published by McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36, N. Y. Price, $6.75.

• • •

TESTING THERMOCOUPLES—A 21-page booklet on Methods of Testing Thermocouples and Thermocouple Materials has been issued as National Bureau of Standards Circular 590. It points out certain precautions that must be observed when testing, if reliable results are to be obtained. Authors are W. R. Roeser and S. T. Lonberger. Order from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price, 20 cents.

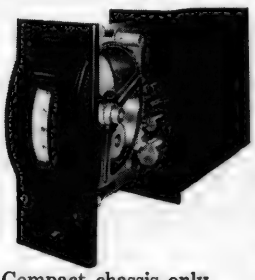
Unlimited remote temperature readings on one Honeywell Electronik* indicator

Scale shown full size. Twin hairline index prevents parallax errors.

With this new, compact indicator, the operating engineer can read temperatures at any point in an air conditioning system simply by pressing a button.

And he gets the most accurate readings known. Honeywell's indicator is accurate to plus or minus 1/5 of a degree because it's electronically precise and its rotating vertical scale—over 28 inches long—gives more than twice the indication area of ordinary circular indicators.

Private offices, zones on each floor, outside air, chilled or hot water lines all can be checked instantly on this one instrument in less than a square foot of panel space. Since sensing elements for the indicator are located right in the thermostat, connected to the indicator by low voltage wiring, there's no need for dual installation.


Compact chassis only 6½" wide. Slides out for inspection without stopping operation of indicator. *Trademark

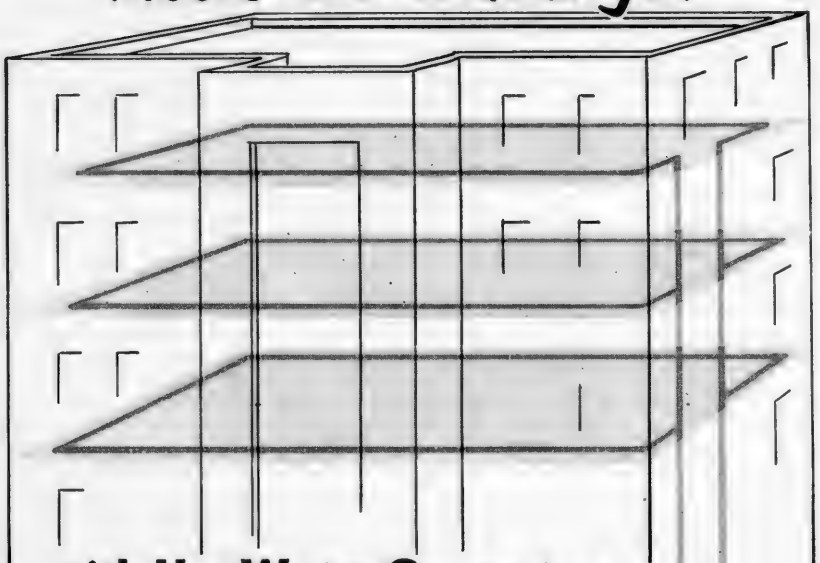
At little extra cost, a Honeywell Systems Analyzer can be added when desired. Using the same wiring and sensing elements as the indicator, it records, on a 12-inch wide strip chart, the readings for any point or combination of points, provides a permanent record.

Honeywell

First in Controls

CYCLOTHERM

meets the challenge!



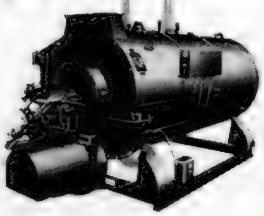
with Hot Water Generators

Specifically designed for

Forced Circulation Systems

Cyclotherm has designed a complete new line of Hot Water Generators built specifically to meet the requirements of forced circulation hot water systems. These Generators distribute water evenly throughout the length of the pressure vessel. Every drop of water contacts an effective heating surface. No short circuits! No trapped areas! No uncontrolled temperatures! *Only* Cyclotherm offers a complete line of Hot Water Generators built for forced circulation systems.

Cyclotherm Generators are shipped ready-to-work, with one manufacturing responsibility back of the entire equipment. No foundation, no excavation, no costly stack. Burning oil, gas and a combination of oil and/or gas, Cyclotherm gives fuel economy. Electronic controls make operation automatic. Maintenance costs cut up to 50%. Capacities from 670,000 BTU per hr. to 6,700,000 BTU per hr. Cyclotherm's world-wide service organization is always at your disposal. For full information, write today.



YEARS AHEAD IN STEAM & HOT WATER GENERATION

CYCLOTHERM® Steam & Hot Water Generators

Cyclotherm Division National-U.S. Radiator Corp.
56 E. First St., Oswego, N. Y.

Clip to your letterhead

56

Please send me your new folder: "For The First Time . . . Package Boiler Economy for Modern Hot Water Systems."

NEW CATALOGS

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

JET PUMP MOTORS— Six-page Bulletin GEA-5902C, published by General Electric Co., Schenectady, N. Y., discusses fractional-horsepower pump motors for all jet pump installations. Illustrated publication includes cutaway views of new ventilating system insulation, and identifies internal parts and construction of pump motor. Bulletin also contains NEMA mounting and shaft dimensions, ratings, and motor sizes.

Circle **Item 63** on Inquiry Card

QUICK COUPLING METHOD— Victaulic Company of America, Elizabeth, N. J., has prepared a 6-page illustrated bulletin describing the Vic-Easy method of quick coupling lightweight pipe or tubing. The bulletin details installation and operating features, explains how the use of lightweight pipe with roll-grooved ends effects substantial savings, and illustrates typical applications.

Circle **Item 64** on Inquiry Card

UNIT AIR CONDITIONERS—An 8-page bulletin, No. 522-F, published by Frick Company, Waynesboro, Pa., gives reasons why the company's unit air conditioners pay for themselves. Also presented are illustrations and specifications of the units in sizes from 3 to 15 tons.

Circle **Item 65** on Inquiry Card

IMMERSIBLE MOTOR— The Louis Allis Co., Milwaukee, Wis., has published a 4-page bulletin, No. 2300, on its immersible motor that is designed for submerged operation. The bulletin describes applications in which the motor is close-coupled to pumps, agitators and mixers, thus eliminating lengthy shaft connections, intermediate bearings, couplings and special bases. Full specifications are listed for the motor, which is manufactured in ratings from ¾ to 40 hp polyphase and ¾ to 5 hp single phase.

Circle **Item 66** on Inquiry Card

FLANGES AND FITTINGS—OTM Corporation, Houston, Tex., announces a comprehensive catalog on OTM flanges, gaskets and seamless welding fittings. Catalog includes a history and outline of the company's operation, and detailed information on its testing methods, as well as specifications on the full line of Blue Ribbon products.

Circle **Item 67** on Inquiry Card

(Continued on page 140)

Complete-line air-conditioning lets Worthington dealers

CUSTOM-QUOTE EVERY JOB!

Probably the most complete line of air conditioning equipment in the world—*Worthington, naturally*—is signing on a select group of new air conditioning dealers—*yourself, possibly?*

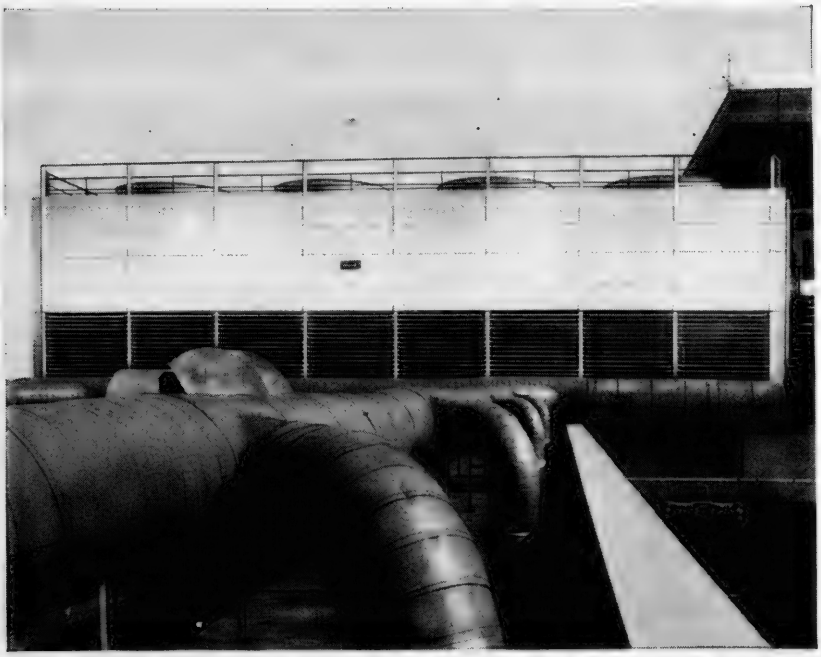
Many, many different models permit these *fortunate* dealers to put together the most efficient and economical combinations of air conditioning equipment for any *specific* job. Handling *exactly* the right equipment for every air conditioning problem eliminates equipment compromises, means these *smart* dealers can "custom-quote" on every job. And behind this job-tailored equipment stands 70 years of respected Worthington experience and front-line service. (Incidentally, these same *intelligent* new dealers will find that Worthington equipment is backed by a 5-year warranty which includes a generous dealer labor allowance.)

Interested in quoting on equipment fashioned to the job, not jobs fashioned to the equipment? Interested in increasing your sales, cutting down on lost orders? If so, *Worthington wants you—and you'll want Worthington.* Write today for the complete air conditioning story. Worthington Corporation, Air Conditioning and Refrigeration Division, Section 12-4, Harrison, N. J.

WORTHINGTON

WORTHINGTON'S COMPLETE COMMERCIAL AND INDUSTRIAL AIR CONDITIONING LINE INCLUDES:

Flexi-cool line: Air-cooled, ceiling-mounted, split systems • Water-cooled, self-contained, ceiling-mounted units • Smallest floor-mounted unit available • Hang it, lay it down, stand it up Vertical and Horizontal cooling coils • Remote water-cooled packaged unit • Water-cooled self-contained packaged unit • Air-cooled packaged units • Air-cooled condensers • Air-cooled condensing units • Packaged water-chillers — hermetic and open • Reciprocating compressors • Air handling units • Evaporative coolers • Evaporative condensers • Fan and coil units



This Binks cooling tower, atop the Palmer House, is the heart of a newly augmented air conditioning system for 1735 guest rooms, dining and shopping facilities.

at the Palmer House in Chicago...

air conditioning water costs cut 96% by Binks cooling tower

"Our Binks cooling tower has done a great job for us," reports Chief Engineer John F. Edelhofer of the Palmer House Hotel. "Since June of 1956 our records show air conditioning water costs are only 4% of what they would have been under our old 'one-pass' system. In terms of volume, we are saving almost 7700 gallons per minute of operation. The tower should pay for itself in five years."

Cooling tower features

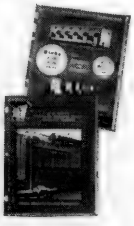
This tower is one of Binks 2-K vertical induced draft series. It cools and recirculates 8000 gallons per minute. Water enters at 95°F and leaves at 85°F. Four 12' diameter aluminum alloy fans assure scientifically balanced air-to-water ratio for high cooling efficiency under all climatic conditions. All panels and framework in the 72' by 42' tower are heavily galvanized and coated to insure minimum maintenance.

A complete line

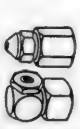
Whether it is for air conditioning or the cooling of manufacturing process fluids, there is a Binks cooling tower of the correct capacity and type for every job.

Send for complete data

Ask your Binks branch office for a copy of Bulletin 333 and Bulletin 477-A or write direct to the address below. Binks engineers will be glad to answer your questions and help you solve your cooling problems. There's no obligation.



Binks
EVERYTHING FOR WATER COOLING



A COMPLETE LINE OF NATURAL DRAFT AND MECHANICAL DRAFT COOLING TOWERS AND INDUSTRIAL SPRAY NOZZLES

Binks Manufacturing Company
3120-38 Carroll Ave., Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

NEW CATALOGS

(Continued from page 138)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

REMOTE AIR-COOLED CONDENSERS — Dunham-Bush, Inc., West Hartford, Conn., has issued Catalog No. 7011 on BC and PFC remote air-cooled condensers. The 32-page catalog, punched for 3-hole standard binder, contains capacities, dimensions, installation suggestions, and complete engineering data. Specific instructions for ordering, with examples, and photos of actual installations are included.

Circle **Item 68** on Inquiry Card

ACCESS DOORS—A complete and coordinated line of latches, hinges, and gasketing material for the sheet metal industry has been developed so that it is now possible to insure a uniformly high standard of quality when making access doors of any size, from the smallest panels to the largest casing doors. Offered by Ventfabrics, Inc., Chicago, Ill., a product catalog illustrates and describes the Ventlok line of access door hardware, access doors, and damper hardware.

Circle **Item 69** on Inquiry Card

POLYETHYLENE DUCTING SYSTEMS— In a catalog published by American Agile Corp., Bedford, Ohio, the company presents details and illustrations of all the necessary components required to design a polyethylene ducting system. Entitled Thermoplastic Corrosion-Proof Ventilating and Exhaust Systems, the 12-page catalog lists standard components and fittings, their exact cost, and the most convenient lengths for installation.

Circle **Item 70** on Inquiry Card

SPRINKLER PIPE INSTALLATION — Technical data sheets showing how to install sprinkler pipe are offered by Ramset Fastening System, Cleveland, Ohio. They show how to obtain maximum efficiency from Ramset fasteners when hanging sprinkler pipe from structural steel, concrete beams, and poured concrete ceilings.

Circle **Item 71** on Inquiry Card

SCOTCH TYPE BOILERS — Burnham Corporation, Irvington, N. Y., has issued a new catalog on its Scotch type steel boilers. Design and engineering data and other information regularly requested by architects and engineers are included. Photos and scale drawings cover both standard and packaged units.

Circle **Item 72** on Inquiry Card

(Continued on page 142)

Pittsburgh Superfine Fiber Glass Insulation is positioned over an aluminum liner in the manufacturing of Stewart-Warner's Instant Heat Conditionaire. Laboratory tests showed that Superfine would last for the life of the heater.

Plastic jacket is fitted over Superfine Insulation. Insulation pads measure 10⅛" x 24⅛" and are ¾" thick. Superfine deadens all noise and vibration of heater motor, fan and exhaust.

Pittsburgh Superfine insulates Stewart-Warner's Instant Heat Conditionaires

The South Wind Division of Stewart-Warner Corporation, Indianapolis, Ind. has developed for Chrysler Corporation the new gasoline-burning Instant Heat Conditionaire which provides instant heat in cold weather for the Chrysler automobile. The Instant Heat Conditionaire is the fastest automobile heater in history.

On the recommendation of Chrysler engineers, Pittsburgh Superfine Fiber Glass Insulation is used in the heater to eliminate all vibration and noise from the engine, fan and exhaust. In addition, the Superfine Insulation must withstand the 300° to 350° F temperatures developed by the heater.

At the conclusion of the 1200-hour test run on the Instant Heat Conditionaire (an equivalent of five years' normal operation), the Pittsburgh Superfine Fiber Glass Insulation showed no appreciable wear or need of servicing. It will last throughout the life of the heater.

Can Pittsburgh Superfine Help You?

Wherever noise or vibration, heat or cold present a manufacturing problem for you, Pittsburgh Superfine Fiber Glass Insulation may be the answer. Why not try it? We will be glad to help you with technical advice. Contact your nearest PPG Sales Office or write us direct. *Pittsburgh Plate Glass Company, Fiber Glass Division, One Gateway Center, Pittsburgh 22, Pennsylvania.*

PITTSBURGH SUPERFINE IS A PRODUCT OF THE FIBER GLASS DIVISION OF PITTSBURGH PLATE GLASS COMPANY

Sales Offices are located in the following cities: Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh and St. Louis

75th ANNIVERSARY 1883—1958 PPG

SYMBOL OF SERVICE FOR SEVENTY-FIVE YEARS

PITTSBURGH PLATE GLASS COMPANY

Which of these ventilation problems do you want solved?

General ventilation and comfort cooling? Removal of fumes, dust, heat and steam? Air circulation, rapid product cooling and drying?

Power Line

solves it these 5 ways surer:

1. Complete line: Broadest product line of air-moving equipment for every industrial requirement.

2. Certified performance: All Power Line Fans are rated by PFMA and NAFM.

3. Backed by 33 years of specialization in manufacture of highest quality ventilation equipment.

4. Competitively priced to give you important cost savings in initial investment and in maintenance. You get the precisely right product to fit your requirements. You don't over-buy with equipment too large or under-buy with equipment too small.

5. Sold only through qualified ventilation specialists. You get expert technical advice and service from the survey of your requirements right through to the completion of your installation.

YOURS ON REQUEST: Big 20-page Power Line Catalog gives complete facts about industrial ventilation, including selection of proper type and size of fan, calculation of dust resistance, and installation procedures, plus features, dimensions, specifications and performance data. Without obligation write for your free copy of Catalog 63B.

POWER LINE FAN COMPANY, INC.

Subsidiary of **Chelsen Products, Incorporated** 639 South Avenue, Plainfield, New Jersey

NEW CATALOGS

(Continued from page 140)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

HEAT AND NOISE CONTROL—Owens-Corning Fiberglas Corp., Toledo, Ohio, announces a 31-page publication entitled Fiberglas Materials for Heat and Noise Control, Air Filtration and Reinforcements. The booklet illustrates and describes use of Fiberglas materials in appliance and equipment manufacture, in the automotive and transportation field, in the railway industry, in air conditioning and heating, as reinforcement for plastics, and for coated and laminated products.

Circle **Item 73** on Inquiry Card

DEW POINT MEASUREMENT—An illustrated 8-page bulletin describes the Alnor Dewpointer which uses the principle of varying pressure, rather than temperature, in determining dew points of any gas sample. Published by Illinois Testing Laboratories, Inc., Chicago, Ill., this bulletin includes illustrations and complete specifications on the entire line of dew point measuring instruments, plus a thorough explanation of the unique principle of operation.

Circle **Item 74** on Inquiry Card

BRAZING INFORMATION—A booklet giving practical information on metals joinery is published by All-State Welding Alloys Co., Inc., White Plains, N. Y. The publication entitled Brazing Manual, contains illustrated data for brazing shapes, sheet, castings, tubing and assemblies of copper, brass, steel, aluminum, and cast iron in order that good sound joints can be made and that the most can be gotten out of the alloys and fluxes designed for brazing.

Circle **Item 75** on Inquiry Card

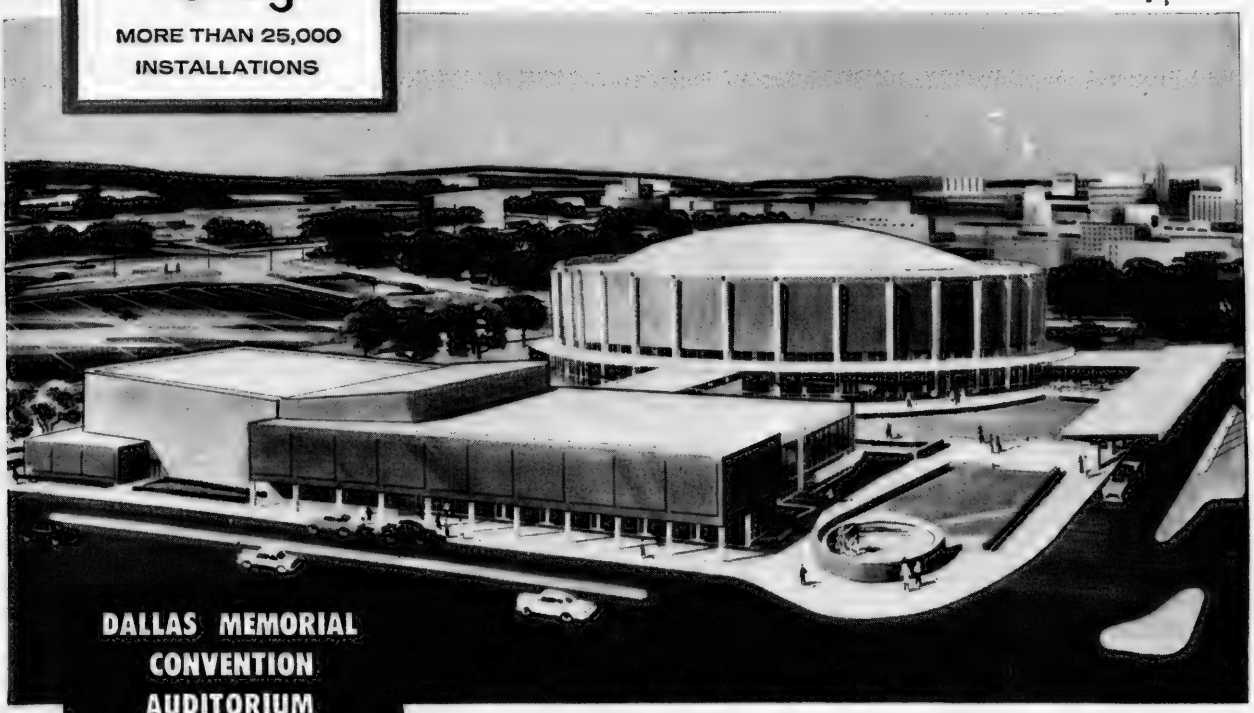
PACKAGED COOLING TOWERS — A 4-page circular, No. SP-1, giving details on the Hydra-Glide line of induced-draft, packaged water cooling towers for use with commercial and industrial air conditioning systems is available from Mason Products, Inc., West Concord, Mass. Easy-to-read charts give specifications, dimensions and performance ratings. Among the features discussed are the use of slip-fit type joints, and just one grease point, greatly simplifying any maintenance work. The towers, available in capacities from 8 to 75 tons, also have a no-warp, nailless filling, said to add years of operational serviceability.

Circle **Item 76** on Inquiry Card

(Continued on page 144)

"from Chicago"

MORE THAN 25,000 INSTALLATIONS

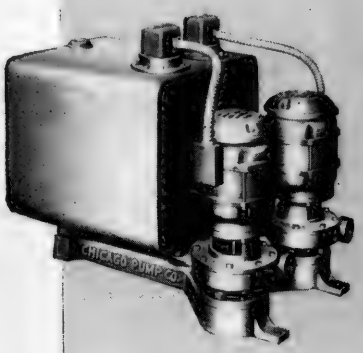


DALLAS MEMORIAL CONVENTION AUDITORIUM

George L. Dahl,
architect and engineer

R. P. Farnsworth and Co.,
general contractor

C. Wallace Plumbing Co.,
plumbing contractor



"SURE RETURN" Condensation Pumps and Receiver . . . with close-coupled type pumps and motors, float switches and a receiver sized in accordance with ASHAE recommendations.

Serviced by SURE RETURN® Condensation Pumps And Receivers

The Dallas Memorial Convention Auditorium, consisting of a main circular building seating 10,000 people, a connecting theatre building seating 2,000 people and a 90,000 square foot underground exhibition hall, relies on Chicago "SURE RETURN" Condensation Pumps and Receivers in its modern heating system.

"SURE RETURN" Condensation Pumps and Receivers are important components of large, modern heating systems everywhere!

THEY NEVER STEAM BIND

. . . because pump suction is always under a head. The suction opening is unusually large . . . insuring low velocity at pump suction, reducing friction and eliminating the possibility of a vacuum.

"SURE RETURNS" are specifically designed for returning condensate in steam heating systems. They are available in both single and duplex units . . . in application ranges from 500 to 75,000 E.D.R. and pressures from 10 to 80 p.s.i.

These pumps and receivers are sold and serviced by competent Distributors located in most principal cities. See the one nearest you today or write direct for full details.

Putting Ideas to Work

fmc FOOD MACHINERY AND CHEMICAL CORPORATION

Chicago Pump Company

622 DIVERSEY PARKWAY • CHICAGO 14, ILLINOIS

36 Burt Free Exhaust Fan Ventilators Rout Heat and Fumes Fast in TRUE TEMPER®'S New Saybrook Forge Plant

Designed and built by The Austin Company, Cleveland, Ohio, True Temper's multi-million-dollar Saybrook Forge Plant uses eighteen 54" and eighteen 42" Burt Free Exhaust Fan ventilators to provide a two-minute air change dependably and economically . . . The entire discharge in Burt Free Exhaust Fan ventilators is vertically upward, with no internal baffles to impede the full flow of air. This highly efficient design provides power capacities of 41,700 cfm for each 54" ventilator and 24,000 cfm for each 42" unit . . . Fresh air at low cost is available for your plants, too, from Burt's complete line. There's a type and size for every ventilating need.

Send for FREE Data Book!

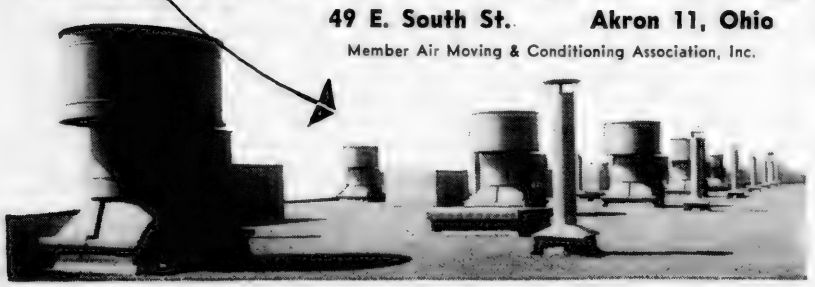
Write for Burt Data Book SPV-101G. It supplies quick data on Burt's complete line of modern Roof Ventilators.

FAN & GRAVITY VENTILATORS | LOUVERS | SHEET METAL SPECIALTIES

The Burt Manufacturing Company

49 E. South St. Akron 11, Ohio

Member Air Moving & Conditioning Association, Inc.



NEW CATALOGS

(Continued from page 142)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

INSULATION ADHESIVES—A bulletin on insulation adhesives for air conditioning ducts and heating pipes is announced by St. Clair Rubber Co., Detroit, Mich. Bulletin gives data on SC 4815 for sealing ducts, SC 4847 for sealing laps, and other adhesives specially formulated by the company for use in bonding insulation.

Circle **Item 77** on Inquiry Card

PACKAGE LIQUID COOLER—Announced by Bell & Gossett Co., Morton Grove, Ill., is Bulletin HB-258 which describes its complete line of package liquid coolers. Sixteen pages give design features, typical installations, and a detailed description of the components of these units.

Circle **Item 78** on Inquiry Card

FLUSH VALVES— Haws-Kramer Flush Valves, Division of Haws Drinking Faucet Co., San Francisco, Calif., has published a 20-page catalog describing its complete line of flush valves. The comprehensive booklet features the company's new Nyla-Phragm flush valves along with piston-type flush valves. Included are rough-in drawings, operational and repair parts drawings, stop valves, vacuum breakers, and flush valve variations.

Circle **Item 79** on Inquiry Card

COPPER DRAINAGE PRODUCTS—C. G. Hussey & Co., Pittsburgh, Pa., has published a 28-page brochure describing its complete line of roofing and drainage products. In addition to detailed descriptions and illustrations of all the company's major roofing products, the catalog contains instructions for determining drainage requirements, information on proper flashing procedures, and engineering data.

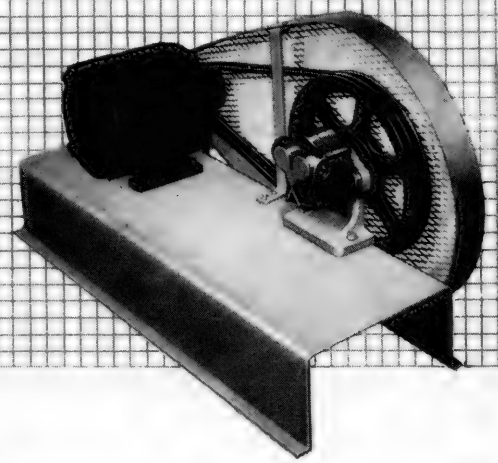
Circle **Item 80** on Inquiry Card

CONVECTOR-AIR CONDITIONER — A folded brochure describing the Weather-Twins is available from Embassy Steel Products, Brooklyn, N. Y. The unit is a combined convector and air conditioner which is housed in an integral, engineered cabinet. The air conditioner is produced by Kelvinator Division of American Motors Corporation, while the convector is manufactured by Embassy Steel Products. The brochure shows why the unit reduces maintenance costs and provides more flexible renting.

Circle **Item 81** on Inquiry Card

(Continued on page 146)

from Webster... NEW SUPPLY PUMP EQUIPMENT



to handle no. 5 and 6 furnace oils

Webster direct drive units are motor driven at 900 rpm optimum speed — relatively low speed lengthens pump life. Capacities and pressures of belt driven sets can be varied to meet specific requirements by changing size of pulleys.

call the man from Webster

HEATING DIVISION
WEBSTER ELECTRIC
RACINE · WIS

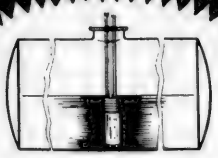
Now the efficiency and high operating performance of Webster supply pumps are available for commercial and industrial applications requiring the handling of heavy oils. The new Webster heavy oil pumps are built in either direct drive or belt drive units with motors ranging from ¼ h.p. to 2 h.p. Plenty of capacity, too . . . from 28 to 575 gph, with pressures up to 300 psi. Extra large ports mean initially cold, heavy oils can be handled without restrictions.

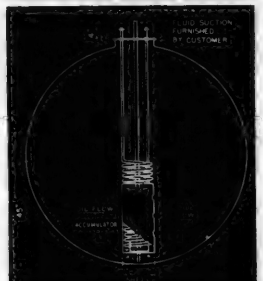
New Webster pumps are compact, easy to install — require less plumbing. Write for additional information.

franklin adv. A-121

HOW TO PREHEAT HEAVY OILS IN BULK STORAGE TANKS

REMPE "Hot Spot" PREHEATER





Preheats fuel oils and other liquids to proper flow temperature before entering the suction line.

Connections furnished for any diameter tank.

No. 5 and Bunker "C" oils flow more freely at high temperatures—have greater BTU value. The Rempe "Hot-Spot" does the preheating job efficiently. Takes the load off the suction pump. All-steel construction. Inlet and outlet pipes furnished in required lengths for any diameter tank. Steam or Hot Water can be used as heat source. Made with 14" or 16" diameter shell.

CONTRACTORS—This is the answer to your customer's oil preheating problems. ***WRITE FOR BULLETIN***

HEAT TRANSFER EQUIPMENT
REMPE CO.
Founded 1902

REMPE COMPANY

358 N. Sacramento Blvd., Chicago 12, Ill.

Another

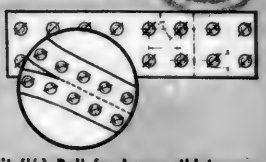
CAIN'S

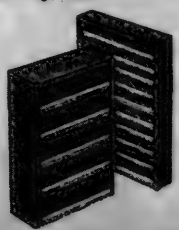
COIL OF PROFIT

LOUVERAIL

ELIMINATES

Layout—Tab Cutting, Hole Punching, Riveting, Spot Welding, Etc..





Split (½) Rail for Louver thicknesses from 1¼ to 1¾". Use Full Size Rail for Louver thickness from 3¼" to 4".

Try this economical and practical method for fabricating Louvers — removable, hinged, or stationary. Louverail is 24 ga. galv. 4½" wide in (2—50' lengths) 1 right and 1 left coiled together. Hundreds of varations possible.

Union Made

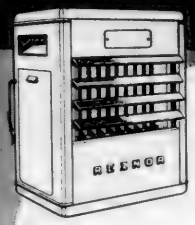
SOLD ONLY THROUGH JOBBERS AND DISTRIBUTORS
Some Territories Open for Manufacturers' Agents Calling on Jobbers and Distributors

CAIN MANUFACTURING CO.

1111 North 5th Avenue Phone FA 2-0354 Birmingham, Alabama

modern heating for business and industry...

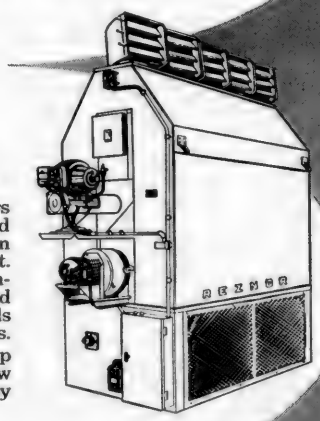
REZNOR UNIT HEATERS



SUSPENDED TYPE

Gas-fired—for use with natural, manufactured, mixed or LP gases. Eleven sizes: 25,000 to 300,000 Btu input. All sizes available with choice of propeller fan or centrifugal blower for air movement. FlexiTemp control system, featuring automatic two-speed fan operation, optional on propeller fan models up to 100,000 Btu. Aluminized steel construction standard, stainless steel optional at extra cost. These heaters are self-contained, completely automatic units for the production and distribution of heat at the point of need. Installation involves only suspension, utility connections and venting. Practically no maintenance required.

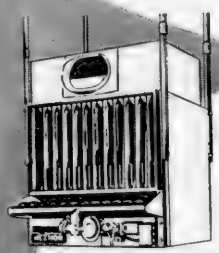
Floor-mounted models for use in offices and similar areas available in 25, 50, 65, and 75 thousand Btu sizes.



FREE-STANDING TYPE

These stainless steel direct-fired heaters are designed for large industrial and commercial space heating jobs. Ten sizes, 400,000 to 2,000,000 Btu input. Heaters can be equipped with gas burners (for natural, mixed, manufactured or LP gases), oil burners (for fuel oils through #5 grade) or dual-fuel burners.

Heaters may be floor-mounted for top discharge or suspended for down-flow or horizontal discharge. They are easily adapted for use in duct systems.



DUCT TYPE

Reznor duct heaters are compact, highly efficient gas-fired heat exchangers with a full complement of operating controls. They are designed for assembly in custom engineered duct systems with components for air moving, cooling and filtering specified to meet exact job requirements.

Series DS sectional duct furnaces (shown) are available in 4 sizes . . . 150, 200, 250, and 300 thousand Btu. Systems with capacities in excess of 2,500,000 Btu can easily be assembled using these four basic units. Aluminized or stainless steel construction. Accessory blowers available to meet most air delivery requirements.

there is no equivalent for Reznor unit heaters

for complete details, wherever you are . . .

Look for Reznor under "Heaters-Unit" in the Yellow Pages

REZNOR

WORLD'S LARGEST SELLING DIRECT FIRED UNIT HEATERS

Reznor Manufacturing Company

64 Union Street, Mercer, Pa.

NEW CATALOGS

(Continued from page 144)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

HEATING AND VENTILATING UNITS—A 48-page illustrated catalog, Bulletin 8927, describing the company's redesigned line of heating and ventilating units is available from American Blower Division of American-Standard, Detroit, Mich. Bulletin describes the types, sizes, and capacities of units available. Separate sections in the bulletin are devoted to such major components as coils, fan section, and accessories. Details of construction are thoroughly discussed, and the significance of sectional construction is explained.

Circle **Item 82** on Inquiry Card

STAINLESS STEEL FITTINGS—An 8-page booklet describing the uses and advantages of its line of Quikupl stainless steel fittings is released by Vanton Pump and Equipment Corp., a division of Cooper Alloy Corp., Hillside, N. J. The fittings have been designed to permit piping engineers to take full advantage of the new and more economical light wall tubing, although Quikupls are also furnished for both OD tube and IPS sizes. Booklet cites examples of how installation costs were cut drastically by using these fittings which eliminate the need for threading, welding, or flaring.

Circle **Item 83** on Inquiry Card

CONDITIONERS AND CONDENSERS — Niagara Blower Co., New York, N. Y., has published Bulletins 133, 137, and 138 describing the company's new series of air conditioners (coil surface type), fan coolers, and refrigerant condensers. The machines are fully described and illustrated; tables of physical data are included.

Circle **Item 84** on Inquiry Card

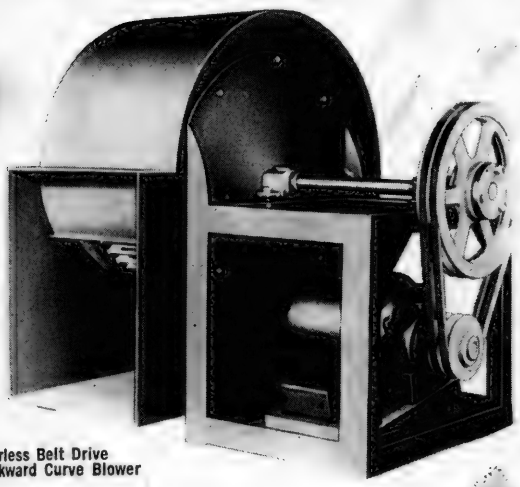
STEEL PIPE FITTINGS—All-steel galvanized pipe fittings are the subject of a 4-page catalog, No. 952, published by Best Fittings, Inc., Chicago, Ill. Covered are pipe caps, bushings, couplings, unions, and plugs. Fittings have been tested under 100-hr salt spray with no signs of rust.

Circle **Item 85** on Inquiry Card

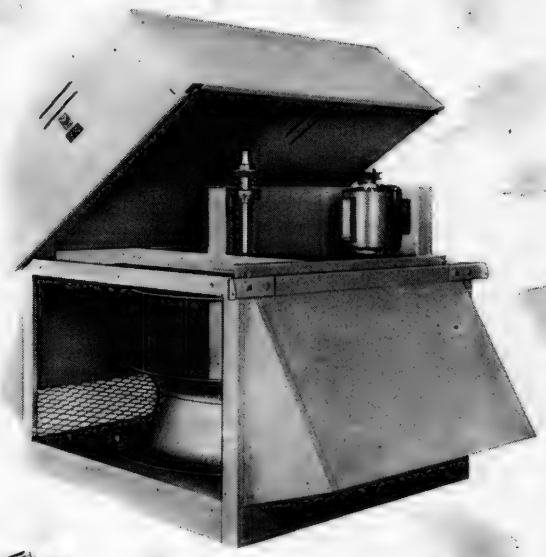
VENTILATING SPECIALTIES—A 4-page bulletin from Leslie Welding Co., Inc., Chicago, Ill., describes, with photos, dimensions, and specifications, the company's lines of ventilating specialties. Included are turbine ventilators, gravity ventilators, and slant-roof and vertical-wall louvers.

Circle **Item 86** on Inquiry Card

(Continued on page 148)



Peerless Belt Drive
Backward Curve Blower



Peerless Belt Drive
Centrifugal Roof Ventilator

TESTED... AND RATED TO AMCA* SPECIFICATIONS

*The new Air Moving and Conditioning Association formed by merging PFMA, NAFM and IUHA.

As a charter member of AMCA, we are naturally vitally interested in listing and rating our air moving products according to AMCA specifications as set forth in the AMCA code. The products you see here are the two most important, basic products in our expanded line of air moving equipment. Along with other Peerless air moving units, they have been designed and manufactured to meet all AMCA standards. With this assurance, Peerless air moving equipment can be specified and installed with confidence. When you have an air moving condition which needs solving, call your nearby Peerless representative or the Peerless factory direct. We can all work together in helping you arrive at the best possible solution.

Write today for Bulletins SDA-160, SDA-200 and SDA-220!

A COMPLETE LINE OF AIR MOVING EQUIPMENT

Charter Member of the Air Moving and Conditioning Association, Inc. (AMCA)

FAN AND BLOWER DIVISION

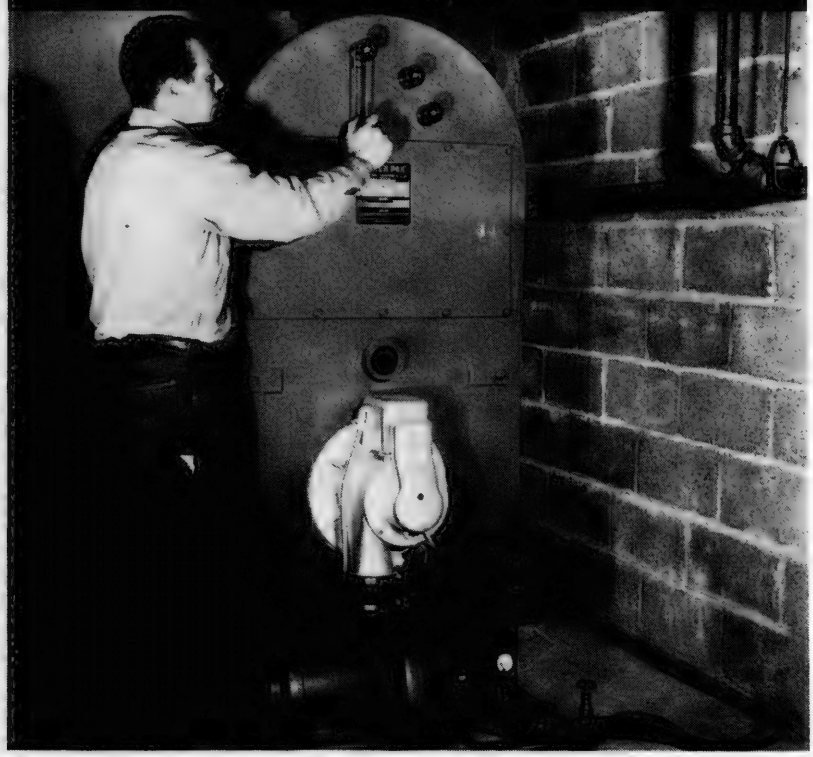
THE Peerless Electric® COMPANY

1400 W. MARKET ST. • WARREN, OHIO

FANS • BLOWERS • ELECTRIC MOTORS

SEE OUR CATALOG IN SWEET'S

"Delivers MORE heat than much bigger boilers"



O&S

POWER-PAK® packaged automatic boiler

"This unit can give heat equivalent to boilers two or three times its physical size," says the plant engineer of a New Jersey manufacturer of overhead doors. "We picked it for its compactness and efficiency."

POWER-PAK is expressly designed for steam or hot water heating service . . . and is integrally equipped with a rugged industrial-type oil or gas burner. Completely assembled and fire-tested before shipment, the unit is easily installed. After hooking up supply and discharge connections, POWER-PAK is ready to fire. Built by Orr & Sembower, the builders of *Powermaster*—the modern packaged automatic boiler with industry-wide recognition for dependable, cost-saving service—you can rely on POWER-PAK for a wide variety of heating jobs. Contact your nearest O & S representative for full details. Ask for Bulletin 1243.

Builders of Dependable Boilers Since 1885

ORR & SEMBOWER, INC.

Morgantown Road, Reading, Pa.

NEW CATALOGS

(Continued from page 146)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

SWIMMING POOL EQUIPMENT—A 52-page 1958 guide for owners and builders of private and public swimming pools is released by Modern Swimming Pool Co., Inc., White Plains, N. Y. Pool builders, engineers, and architects will find the uses, specifications, and prices of over 100 items of pool equipment, chemicals, and paint a valuable aid to estimating the requirements for a new pool and the operation and maintenance of an existing pool.

Circle **Item 87** on Inquiry Card

PUMP LOADS AND STRESSES — Radial loads—what causes them, how to measure them, and how their effects on the company's process pumps are controlled—is the subject of a booklet recently made available by Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif. Prepared from the original research papers, the booklet, Mechanical Considerations in Pump Design, describes the cause, effect, and cure of damaging radial thrust forces on pump impellers, bearings, wear rings, seals and stuffing boxes, and the shaft itself.

Circle **Item 88** on Inquiry Card

BACKWARD-BLADE FANS—General Blower Co., Morton Grove, Ill., has published Bulletin BB-105 describing the company's backward-blade centrifugal fans. The fans are designed for use in heating, ventilating, and air conditioning systems; power plant installations; and industrial processes. Bulletin includes engineering data, specifications, performance tables, and selection and arrangement information on the 19 basic fan sizes.

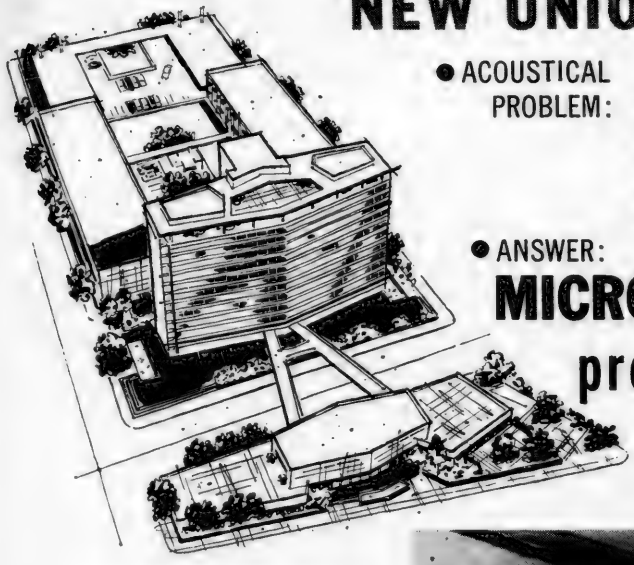
Circle **Item 89** on Inquiry Card

PRESSURE, LEVEL CONTROLS—A comprehensive guide to the selection of the proper controls for automatically controlling liquids at predetermined levels or pressures in domestic, municipal, industrial, or military applications is offered by Automatic Control Co., St. Paul, Minn. The guide features simplified, integrated, interwired electrical control systems for starting, stopping, and alternating pumps, motors, and compressors either on-site or remotely for reservoirs, elevated tanks, sumps, and tankless systems. A 24-page price list gives complete pricing and ordering information.

Circle **Item 90** on Inquiry Card

NEW UNION OIL CENTER

Los Angeles, California

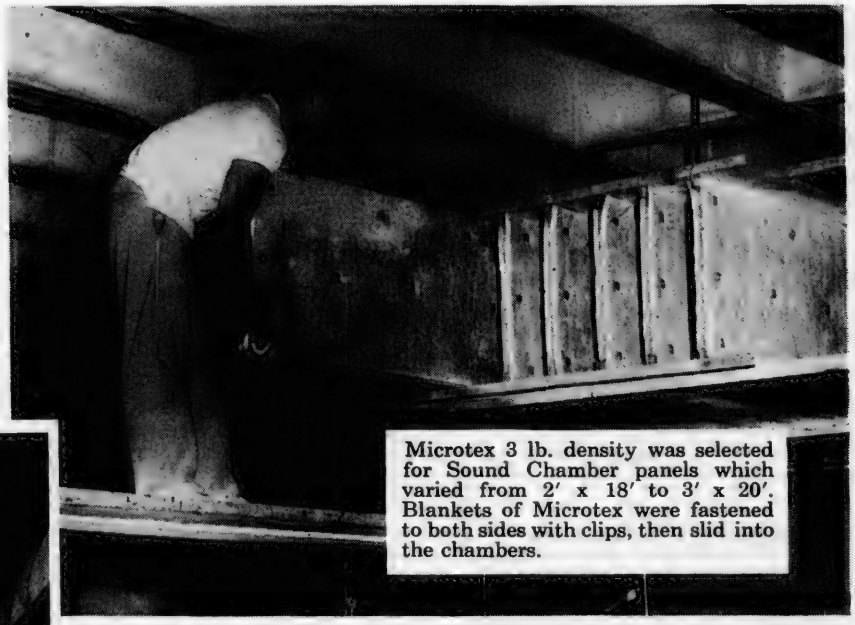


● ACOUSTICAL PROBLEM: **Supply duct velocity 3600 ft./min. Return ducts 1200 ft./min., with 8½ lbs. of static pressure: Unusually heavy equipment required to carry load; sound chambers needed to reduce high velocity noises; labor costs must be held to a minimum.**

● ANSWER:

MICROTEX DUCT INSULATION provides notable insulation value per dollar

Eight carloads of Microtex Glass Fiber Insulation used in the largest air conditioning insulation job in the history of the West Coast. *Architect:* Pereira & Luckman; *Contractor:* Del E. Webb Construction Co.



Microtex 3 lb. density was selected for Sound Chamber panels which varied from 2′ x 18′ to 3′ x 20′. Blankets of Microtex were fastened to both sides with clips, then slid into the chambers.

Efficiency in Operation . . . Simplicity in Application

Nearly 80% of all insulation in the Union Oil Center is Microtex

Reason: Microtex absorbs fan and motor noises, soaks up sounds transmitted through the ducts, increases system efficiency. A low density, resilient blanket insulation, Microtex is made from fine glass fibers, bonded together, creating countless microscopic dead air cells which account for its high thermal and sound absorption characteristics.

For full information call or write any L·O·F Glass Fibers' sales office or distributor.

L·O·F GLASS FIBERS

L·O·F GLASS FIBERS COMPANY TOLEDO 1, OHIO

for DUST

CONTROL

install

FLEXAUST®

HOSE

Made of strong neoprene coated cotton or nylon fabrics spiral wire reinforced.
For *all* kinds of dust collecting uses, particularly good for elbows and moving hoods.
Exceptionally easy to cut, install, connect, reuse, and relocate.
Sizes 1¼" thru 36" i.d.

Write for details today
Distributors in all principal cities

THE FLEXAUST COMPANY
Dept. HV-6
[illegible] PARK AVE. NEW YORK 17, N. Y.

NEW CATALOGS

(Continued from page 148)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

WALL-TYPE FIXTURE SUPPORTS—A 24-page manual, No. 60, describing Thinline supports for wall closets, urinals and lavatories is published by Plumbing Products Division of Zurn Industries, Inc., Erie, Pa. It presents advantages and product features of the slim, compact units, in addition to selection data for their use.

Circle **Item 91** on Inquiry Card

AMMONIA PRODUCTS—A condensed catalog (81C8b) on the company's ammonia products is available from Recold Corp., Los Angeles, Calif. Included in the illustrated catalog is basic information on sizes, ratings, overall dimensions, and approximate shipping weights.

Circle **Item 92** on Inquiry Card

TEMPERATURE CONTROLS — A temperature controls catalog is available from United Electric Controls Co., Watertown, Mass. Designated as Condensed Catalog 400, this 8-page booklet furnishes an unusual amount of specifications in addition to the necessary descriptive data. Describing a wide variety of both local mounted and remote bulb temperature controls, it includes general purpose, dual switch, explosion-proof and indicating type units.

Circle **Item 93** on Inquiry Card

SEWER PIPE COUPLING—Including detailed drawings, depicting the function of the Fluid-Tite gasket in asbestos-cement sewer pipe couplings, a 4-page brochure published by the manufacturer, Keasbey & Mattison Co., Ambler, Pa., also describes the rigid tests for resistance to infiltration to which the coupling was subjected.

Circle **Item 94** on Inquiry Card

LIGHTWEIGHT BUILDING INSULATION—A reference file folder is offered by United Cork Companies, Kearny, N. J., manufacturers of Uni-Crest lightweight expanded polystyrene insulation material. Descriptive data lists physical properties and qualities including low thermal conductivity, resistance to water and water vapor, light weight and ease of handling, and resistance to fungus, rot or vermin. Folder contains specification sheets for applications of Uni-Crest to a variety of perimeter heating duct, foundation, and concrete slab insulation problems.

Circle **Item 95** on Inquiry Card

(Concluded on page 152)

FAN tas tic

Aeromaster FANS

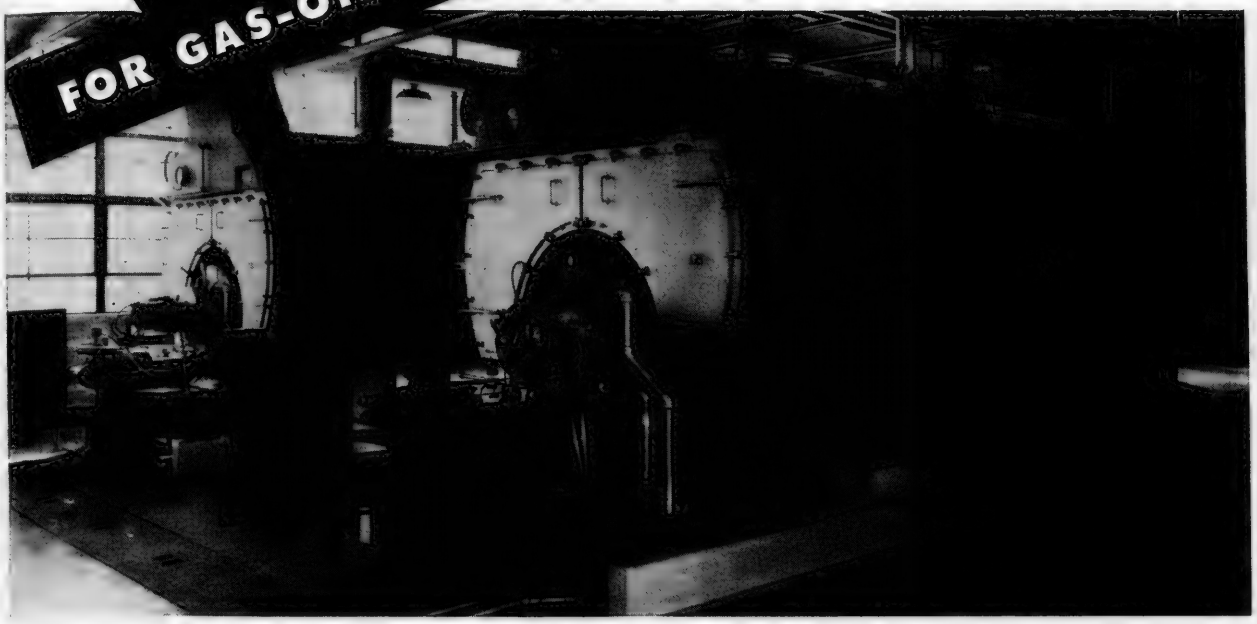
increase cooling tower efficiency with MORE CFM and LESS HP

Precision engineered Aeromaster Fans with variable pitch blades and anti-flutter design give cooling at *lower cost.* Blades resist acids, alkalies, abrasion and weather. 4, 6 or 8 blade styles in 54″ to 22′ diameters. Before you replace or consider new equipment, write: KOPPERS COMPANY, INC., 6906 Scott Street, Baltimore 3, Md.

KOPPERS Aeromaster Fans

Engineered Products Sold with *Service*

FOR GAS
FOR OIL
FOR GAS-OIL COMBINATION



Petro Boiler-Burner unit installation at the Lambert-St. Louis Municipal Airport , St. Louis, Missouri

Here in one complete package . . . is the PETRO FORCED DRAFT FIRING SYSTEM

Available as a complete boiler-burner unit. The Petro firing unit, integrated with matched Scotch boiler (as shown above), is a complete boiler-burner unit. Installation consists of little more than attaching fuel and power lines. No pitted boiler settings; no high stacks; no separate air supply; no panel wiring. It is a thoroughly engineered unit, factory tested, with all vital components matched and mounted on a single base.

Available as a burner unit only...will fit any boiler. Petro firing units can be applied to any boiler. The entire system is factory-built, wired and tested. Everything needed for ultra modern firing is mounted on a rigid steel frame ready to bolt to the boiler front. Integrated air system makes the usual firing arch, firebox pit and brick checker floor unnecessary.

Saves installation costs. Whether you buy the complete boiler-burner unit or install the Petro forced draft firing system in your present boiler, you save time and money and avoid several local contracts. The job is backed by factory responsibility. All the needed component parts have been engineered and installed as a working unit fitted to specific boiler and fuel requirements . . . it's ready to render peak service from the very start.

No stack needed. Petro forced draft firing units eliminate high stacks. In fact, the only flue connection necessary is to a simple vent for the spent products of combustion. Unlike induced draft systems, the Petro blower operates in clean, relatively cool air. No maintenance problems arise from overheated bearings or corrosive gases. Power consumption is cut, too, for with the contracted volume of cool air, a motor only about one-half as large as that used with induced draft burners is required.

Switches fuels quickly. The combination gas-and-oil firing system embodies distinct advantages of continuous operation. Alternate fuels may be introduced in as little as 60 seconds. No extended shutdown of equipment. Controls for completely automatic changeover of fuels are also available.

For more information please mail the coupon.

See Petro Catalog in Sweet's Architectural File

PETRO
T. M. REG. U. S. PAT. OFF.

HEATING
AND POWER
EQUIPMENT

PETRO, 3227 West 106th Street, Cleveland 11, Ohio.
(In Canada, write to 80 Ward Street, Toronto, Ontario)
Please send catalog and specifications on Petro gas and oil firing units.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

AirMpeler

LO-BOY
CENTRIFUGAL
ROOF EXHAUSTERS

Enhance The Beauty Of Building Skylines

Pats. Pend.

Lowest Silhouette Design

FORWARD OR BACKWARD CURVE WHEEL WITHIN . . . . OR OUT OF SCROLL HOUSING

Motor mounting on side of structure support . . . out of line of air stream reduces height of Lo-Boy models nearly 50% of older designs.

LOW WIND RESISTANCE
SIZES 10",-72" 600-47,000
CERTIFIED C.F.M. RATINGS

- **QUALITY**
- **BEAUTY**
- **PROVEN PERFORMANCE**

See Sweet's File 20c/Amm or Write for bulletin AC100-58

AMMERMAN CO., INC.
109 North Second St.
Minneapolis 1, Minnesota
MEMBER OF THE AIR MOVING & CONDITIONING ASSN.

NEW CATALOGS

(Concluded from page 150)

Use the prepaid postcard on last page for securing your copies of catalogs described in this department.

DIFFUSERS, REGISTERS, GRILLES — A wall calendar, prepared by Lima Register Co., Lima, Ohio, features a complete product selector-chart and an engineering data sheet in addition to the 1958 calendar. Diffusers, registers and grilles for floor, baseboard, wall and ceiling applications are illustrated and identified in the selector-chart. Products can be selected by type and style with a glance at the wall calendar. An engineering data sheet appears underneath the calendar pad for handy reference.

Circle **Item 96** on Inquiry Card

SUN CONTROL VISORS—A 4-page bulletin published by Clearview Corp., Dallas, Tex., describes how large building air conditioning requirements can be reduced by use of the manufacturer's sun control visors. The aluminum devices combine functions of awning, ventilation and light control, prowler guard, storm shutter, and outside venetian blind.

Circle **Item 97** on Inquiry Card

STEEL FIRE-TUBE BOILERS—A booklet entitled Forty Facts You Should Know About Kewanee Boilers, is offered by Kewanee Boiler Division of American-Standard, Kewanee, Ill. The booklet covers the general characteristics of the entire line of boilers, both high and low pressure, both firebox and Scotch type.

Circle **Item 98** on Inquiry Card

MOTORS FOR DOMESTIC HEATING — An 8-page publication, GEA-6718, from General Electric Co., Schenectady, N. Y., covers the company's full line of fractional horsepower split-phase, capacitor-start, shaded-pole, and permanent-split capacitor motors for oil burner, belt-driven blower, and direct-driven blower applications. Bulletin gives complete product information including dimensions, ratings and motor sizes.

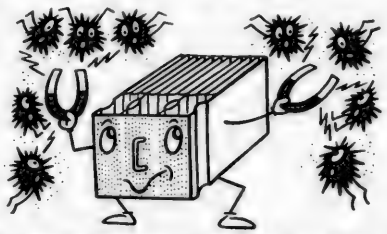
Circle **Item 99** on Inquiry Card

TUBING INSTALLATIONS — A 20-min color movie showing some of the hazards encountered in tubing installations and how to avoid them, has been produced by The Imperial Brass Mfg. Co., 6300 W. Howard St., Chicago, Ill. The film demonstrates the correct way of handling tube cutting, flaring, and bending operations. The movie is currently being presented at sales meetings with the company's distributors, and also is shown at Tubemanship Clinics being held by distributors with industrial plants and trade schools.

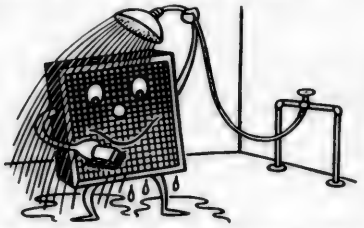
AIR-MAZING FACTS

BY O.SOGLOW

WHAT'S YOUR OVERHEAD CHARGE? About 200 volts, physicists say. That's because the air around our heads is charged some 200 volts positive as compared with the ground on which we walk. But don't worry, this static charge has been going on since the dawn of time and nobody's been "shocked" by it yet.



MAGNETIC PERSONALITY! More than 90% of all air-borne dust and pollen, even smoke particles, are drawn right out of the air by Electromaze electronic air filters. Used from coast to coast wherever super-clean air is desirable, Electromaze filters are more flexible in size, quicker to install and easier to clean.



NEW FILTER CLEANS ITSELF! You don't have to clean an Automaze air filter. It cleans itself—*automatically!* Automaze's continuous belt of filter panels rotates through a cleaning tank where "pulse-type" action agitates each panel, removes the accumulated dirt. Goes 3 to 6 months without attention.

FOR AIR CONDITIONING AND VENTILATING EQUIPMENT, ENGINES, COMPRESSORS *or any device using air or liquids*—there is an Air-Maze filter engineered to solve each filtering problem. For new all-line catalog, write Air-Maze Corporation, Dept. A-6, Cleveland 28, Ohio.

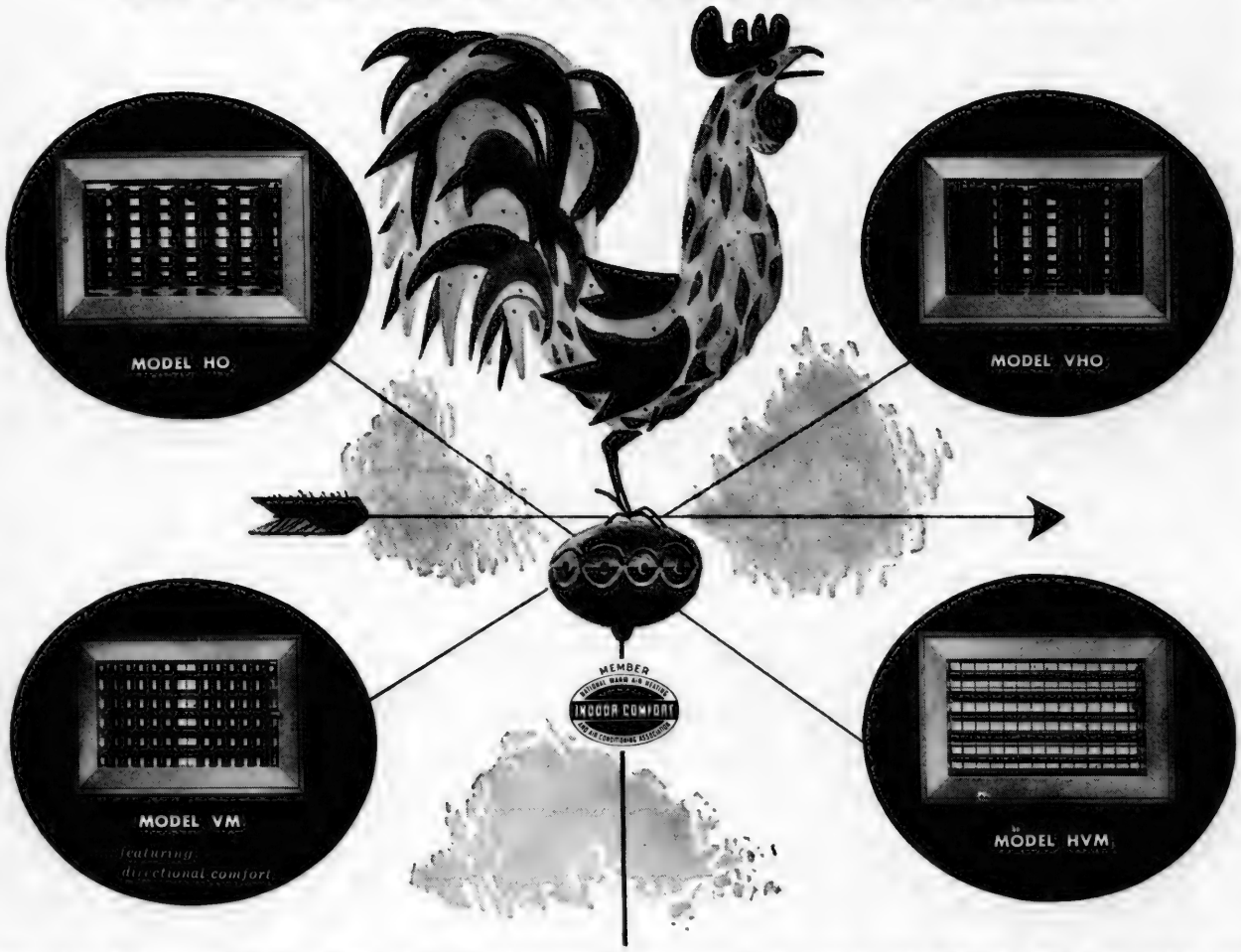
AIR-MAZE
The Filter Engineers

AIR FILTERS • SPARK ARRESTERS • LIQUID FILTERS
SILENCERS • OIL SEPARATORS • GREASE FILTERS

NEW! from STANDARD

the *modulaire* SERIES

AIR-CONDITIONING REGISTERS and GRILLES



Standard introduces a new line of air-conditioning registers and grilles with **MODULAIRE.** Standard calls this concept "directional comfort" and it means just what it says . . . the right pattern and velocity of cool air for any given air-conditioned space. There are **MODULAIRE** models available with a variety of face bar combinations (horizontal and vertical; single and double bank) with either opposed blade dampers or multi-valve louvers . . . models to fit any need . . . any application. Write for Standard's new catalog!

MODEL HO
Single Bank Deflection Register with Opposed Blade Dampers

MODEL VM
Single Bank Deflection Register with Multi-Valve Louvers

MODEL HVM
Double Bank Deflection Register with Multi-Valve Louvers

MODEL VHO
Double Bank Deflection Register with Opposed Blade Dampers

Mail coupon for free catalogs and information on the complete STANDARD line of registers and grilles for all your air-conditioning, heating, and two-way system needs!

INCLUDED AMONG STANDARD'S REPRESENTATIVES:

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Cliff Derbes Associates, Inc., 2430 N.W. 140th Street, Opalocka, Florida
H. E. Culley, 414 W. Main Street, Louisville, Kentucky
Les Gary, P.O. Box 57, Gates Mills, Ohio
George Bolinger, 901 W. Vickery, Fort Worth, Texas
G. R. McKenzie, 2811 So. 20th Street, Birmingham, Alabama
Mike Mitchell, West Jefferson Street, Kosciusko, Mississippi
Irwin I. Platsky, 73-35 135th Street, Flushing C, New York

STANDARD
STAMPING & PERFORATING CO.
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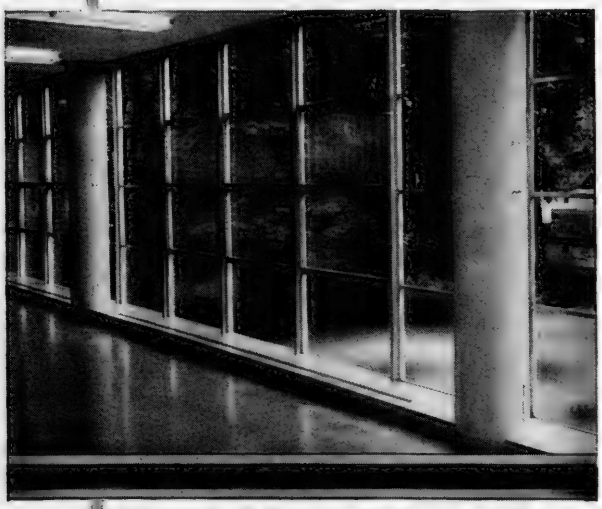
Gentlemen: Please send me the following
☐ Standard MODULAIRE air-conditioning catalog
☐ Standard Register and Grille Catalog

Name_____
Company_____
Address_____
City_____ Zone____ State_____

Blend It... Hide It... Combine It...



Installed as a continuous strip in window head or sill (as above), AGITAIR STRIPLINE is the only practical means for air curtaining plate glass windows or wall areas to counteract summer heat or winter chill.

AGITAIR®

STRIPLINE

DIFFUSERS

BLEND IT . . . specify AGITAIR STRIPLINE as a continuous decorative unit, or in sections to meet any requirements of interior treatment.

HIDE IT . . . in shallow lighting coves for perfect concealment.

COMBINE IT . . . with unit or continuous lighting fixtures.

AND REMEMBER . . . no matter how you use it — AGITAIR STRIPLINE diffusing vanes create maximum mixing and aspiration . . . quick temperature equalization . . . and correct air distribution over any desired length.

Every Inch a Diffuser . . . the Vanes Make the Difference

AIR DEVICES INC.

185 MADISON AVENUE, NEW YORK 16, N. Y.

AIR DIFFUSERS • FILTERS • EXHAUSTERS

(Concluded from page 100)

of best advantage in combating the type of fire that will be prevalent in this building. In this instance, however, the basic extinguishing agent will take care of fires peculiar to this type of occupancy but attention must also be given to the building itself. Thus, it is imperative that an additional system be furnished. This extra need has been indicated as A-1, which affords the engineer a number of systems from which to choose. In this regard he may select either the fire standpipe system or a sprinkler system, whichever is the more appropriate for the building.

Summary

Table 1 and Table 2 are not intended to be accurate tables that the engineer can use as a rule, but instead merely represent the line of individual thinking that is required for each type of building before the engineer can proceed with the design of the actual fire protection system that will be utilized. Factual data of accurate nature must always be obtained from the local fire authorities, the fire underwriters and this information can certainly be found in the publications listed earlier in this article. Manufacturers of the various types of fire protection equipment should always be consulted for first hand information on the manner in which their equipment will function for the different types of fires.

From the data presented herein, it becomes apparent that just one type of extinguishing agent alone is often not sufficient to assure complete safety in the event of a fire. Thus, secondary systems or means are very vital and provide a much higher degree of positive protection.

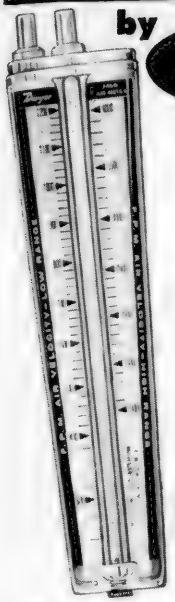
Canadian Degree-Days for April, 1958*

City	April		Cumulative	
	1958	Normal	1957-58	Normal
Calgary, Alta.	793	770	8362	8510
Charlottetown, P. E. I.	734	870	6677	7770
Crescent Valley, B. C.	659	610	6629	7210
Edmonton, Alta.	727	760	8752	9420
Fort William, Ont.	793	890	8907	9640
Grande Prairie, Alta.	788	830	9638	9930
Halifax, N. S.	654	765	5732	6762
London, Ont.	570	650	6760	6900
Medicine Hat, Alta.	633	620	7761	8130
Moncton, N. B.	724	830	6994	8020
Montreal, P. Q.	608	730	7120	7970
North Bay, Ont.	689	840	8292	9050
Ottawa, Ont.	589	730	7361	8250
Penticton, B. C.	491	490	5392	6010
Prince George, B. C.	716	740	7745	8500
Quebec City, P. Q.	731	850	7773	8810
Regina, Sask.	678	790	9165	9980
St. John, N. B.	721	830	6827	7870
Saskatoon, Sask.	716	800	9375	10190
Timmins, Ont.	793	1010	9480	10510
Toronto, Ont.	518	646	6132	6582
Vancouver, B. C.	465	480	4357	4910
Victoria, B. C.	482	470	4184	4520
Windsor, Ont.	508	580	6117	6290
Winnipeg, Man.	669	810	9001	9988

* These data are supplied through the courtesy of the Meterological Division Air Service Branch, Department of Transport, Canada.
The Department reports a light revision in a figure for March as published in last month's issue. Corrected figure is: Montreal, P. Q., 1006.

new No. 460 AIR METER

by Dwyer



An All Purpose Low-Cost Instrument for Static Pressure and Air Velocity Measurements

High and low ranges give direct velocity readings from 260 to 4000 fpm.

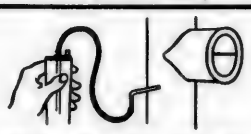
Static pressure readings from .005 to 1.0 inches of water.

Complete with every accessory for adjusting and balancing air conditioning, heating and ventilating equipment.

Fits in shirt pocket.

Supply Grille Velocity

Return Grille Velocity



Over-Fire and Smoke Pipe Draft

Static Pressure

WRITE FOR BULLETIN B-9

F. W. DWYER MFG. CO.

P. O. Box 373N
Michigan City, Indiana

INTERNATIONAL-LaMONT—proven superiority for HIGH TEMPERATURE WATER GENERATION

Over 2 BILLION Btu./Hr.

(2,010,800,000 Btu/hr.)

TYPICAL INSTALLATIONS

INDUSTRIAL
- Douglas Aircraft Corp.
- Continental Can Co.
- Union Carbide Nuclear Co.
- Norton Co. (Behr-Manning Div.)
- Johnson & Johnson
- American Airlines Inc.

U.S. AIR FORCE BASES
- Lockbourne, Ohio
- Otis, Mass.
- Mountain Home, Idaho
- Plattsburgh, N. Y.
- Westover, Mass.
- K. I. Sawyer, Mich.
- Minot, North Dakota
- Suffolk County, N. Y
- Glasgow, Montana
- Truax, Wisconsin
- Clinton County, Ohio
- Olmstead, Penna.
- Bakalar, Indiana
- McGuire, N. J.

U.S. NAVY BASES
- Coronado, Calif.
- Willow Grove, Penna.
- Columbus, Ohio
- Great Lakes, Ill.

SCHOOLS & UNIVERSITIES
- Rutgers University
- Hilltop Elementary School
- American River Jr. College
- Madeira High School
- Brigham Young University
- Indian Hill Elementary School
- Holy Apostles School
- Maple Park Elementary School

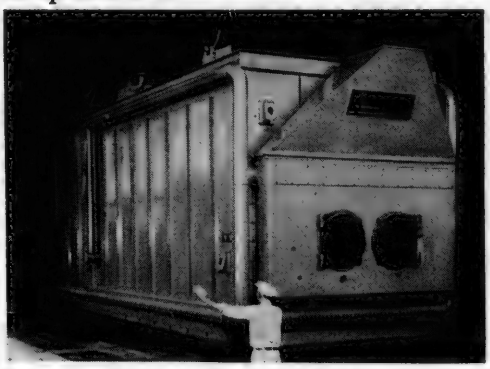
HOSPITALS
- Loring AFB Hospital
- N. E. Florida Mental Hospital

MISCELLANEOUS
- New York International Airport, Idlewild

. . . that is the combined total hourly capacity of more than 75 International-LaMont Forced Recirculation Generators throughout the country—and the total is rapidly increasing as new units are placed into operation.

The economies of an HTW system (350°F. to 430°F.) over high pressure steam are significant . . . with International-LaMont Generators the savings are dramatic: 15-18% in installation . . . 15-20% in operation . . . 50-60% in maintenance.

Only International-LaMont Generators feature a built-in counterflow economizer which preheats return water and permits use of cost-cutting temperature differentials of up to 200°F.



International-LaMont Forced Recirculation Generators are available as package units up to 60,000,000 Btu/hr.

The inherent advantages of High Temperature Water for large area district heating systems have been found equally valuable for single building installations. The International-LaMont THERMOJET© series of forced recirculation generators are specifically designed for this type of application.

Write today for Bulletins 700 and 1000.

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890 Spruce St. East Stroudsburg, Pa.

Steel Firebox Heating & Power Boilers • Low & High Pressure Water Tube Package Boilers • International-LaMont Forced Recirculation Generators • ASME Code Pressure Vessels & Welded Products.

ALL STANDARD D-H "PERMA-FAN"

DRAYER

EVAPORATIVE CONDENSERS

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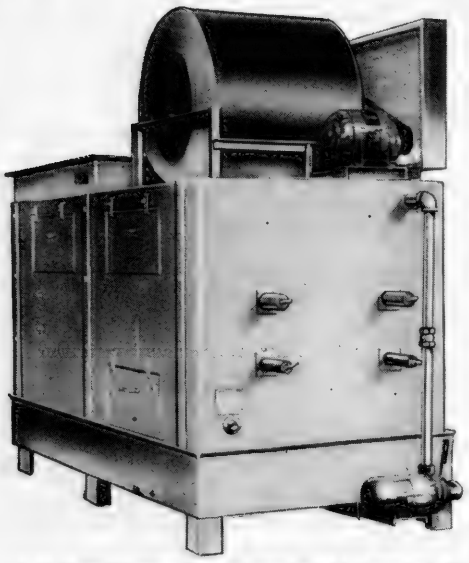
ARE HOT-DIP GALVANIZED

"PERMA-FAN"

AFTER FABRICATION!



A D-H EXCLUSIVE! FOR FREON 12; FREON 22; AMMONIA. THE D-H PIONEERED BLOW-THRU PRINCIPLE...NOT DRAW-THRU! PRIMARY COIL SURFACE COPPER TUBING. VOLUME DAMPER ADJUSTMENTS. PRICE? WAY DOWN, ON BEDROCK! 12 MORE FEATURES SHOWN IN OUR "PERMA-FAN" BULLETIN. MAY WE SEND YOU A COPY? WRITE:

d-h SINCE 1910

drayer-hanson

DIVISION OF NATIONAL-U.S. RADIATOR CORP

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LOS ANGELES 63, CALIFORNIA

CABLE: CLINCONI LOS ANGELES

COMING EVENTS

Where listed, names or titles of individuals are those from whom further information is available

SAE MEETING—Summer meeting of the Society of Automotive Engineers, at the Chalfonte-Haddon Hall, Atlantic City, N. J. Secretary of the Society, 485 Lexington Ave., New York 17, N. Y. ..... **JUNE 8-13, 1958.**

OIL HEAT EXPOSITION—22nd Oil Heat and Air Conditioning Exposition at the New York Coliseum, New York. C. H. Pesterfield, secretary, Oil Heat Institute of America, Inc., 500 Fifth Ave., New York 36, N. Y. ..... **JUNE 9-12, 1958.**

MATERIALS HANDLING CONFERENCE—Materials Handling Conference, sponsored by the American Society of Mechanical Engineers, at the Public Auditorium, Cleveland, Ohio, to be held concurrently with the National Materials Handling Exposition. Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y. **JUNE 9-12, 1958.**

INTERNATIONAL AUTOMATION EXPOSITION—Fourth International Automation Exposition and International Automation Congress, at the Coliseum, New York, N. Y. Richard Rimbach Associates, 845 Ridge Ave., Pittsburgh 12, Pa. ..... **JUNE 9-13, 1958.**

ASTM MEETING—Annual meeting of the American Society for Testing Materials, at the Hotel Statler, Boston, Mass. Secretary of the Society, 1916 Race St., Philadelphia 3, Pa. .. **JUNE 22-27, 1958.**

JOINT ASHAE-ASRE MEETING—Joint summer meeting, American Society of Heating and Air-Conditioning Engineers, at the Nicollet Hotel, and American Society of Refrigerating Engineers, at the Hotel Leamington, Minneapolis, Minn. A. C. Hutchinson, secretary of the ASHAE, 62 Worth St., New York 13, N. Y., and R. C. Cross, secretary of the ASRE, 234 Fifth Ave., New York 1, N. Y. ..... **JUNE 23-25, 1958.**

STORE MODERNIZATION SHOW—National Store Modernization Show, sponsored by the Store Modernization Institute, at the Coliseum, New York. Exposition Management Corp., 51 E. 42nd St., New York 17, N. Y. ..... **JUNE 23-26, 1958.**

INSTRUMENT-AUTOMATION EXHIBIT — Instrument-Automation Conference and Exhibit, of the Instrument Society of America, at Philadelphia Convention Hall, Philadelphia, Pa. Secretary of the Society, 313 Sixth Ave., Pittsburgh 22, Pa. ..... **SEPTEMBER 15-19, 1958.**

ELECTRONICS CONFERENCE—1958 National Electronics Conference, sponsored by the American Institute of Electrical Engineers, Illinois Insitute of Technology, Institute of Radio Engineers, and Northwestern and Illinois Universities, to be held at the Hotel Sherman, Chicago. R. E. Hornacek, Publicity Committee Chairman, Illinois Bell Telephone Co., 208 W. Washington St., Chicago 6, Ill. ..... **OCTOBER 13-15, 1958.**

AGA CONVENTION—Annual convention, American Gas Association, at Convention Hall Auditorium, Atlantic City, N. J. Secretary of the Association, 420 Lexington Ave., New York 17, N. Y. ..... **OCTOBER 13-15, 1958.**

REFRIGERATION WHOLESALERS MEETING—Annual meeting of the Air-Conditioning and Refrigeration Wholesalers, at the Sheraton-Palace Hotel, San Francisco, Calif. Secretary of the Institute, 2607 N. High St., Columbus, Ohio. ..... **OCTOBER 22-24, 1958.**

PLASTICS INDUSTRY EXPOSITION—Eighth national plastics exposition of the Society of the Plastics Industry, Inc., at International Amphitheatre, Chicago, Ill., to be held concurrently with the SPI annual national conference, Morrison Hotel, Chicago. Secretary of the Society, 250 Park Ave., New York 17, N. Y. ..... **NOVEMBER 17-21, 1958.**

POWER SHOW—23rd National Exposition of Power and Mechanical Engineering, under the auspices of The American Society of Mechanical Engineers, in conjunction with the Society's 78th annual meeting, at the Coliseum, New York. E. K. Stevens, president, International Exposition Co., 480 Lexington Ave., New York 17, N. Y. ..... **DECEMBER 1-5, 1958.**

EXPOSITION AND ASHAE CONVENTION—65th annual meeting, American Society of Heating and Air-Conditioning Engineers (Jan. 26-29, 1959) and 14th International Heating and Air Conditioning Exposition, Philadelphia, Pa. A. V. Hutchinson, secretary of the Society, 62 Worth St., New York 13, N. Y. ... **JANUARY 26-30, 1959.**

ARI EXPOSITION—11th Exposition of the Air-Conditioning and Refrigeration Industry at Convention Hall, Atlantic City, N. J. Geo. S. Jones, Jr., managing director of Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N. W., Washington 6, D. C. ..... **NOVEMBER 2-5, 1959.**

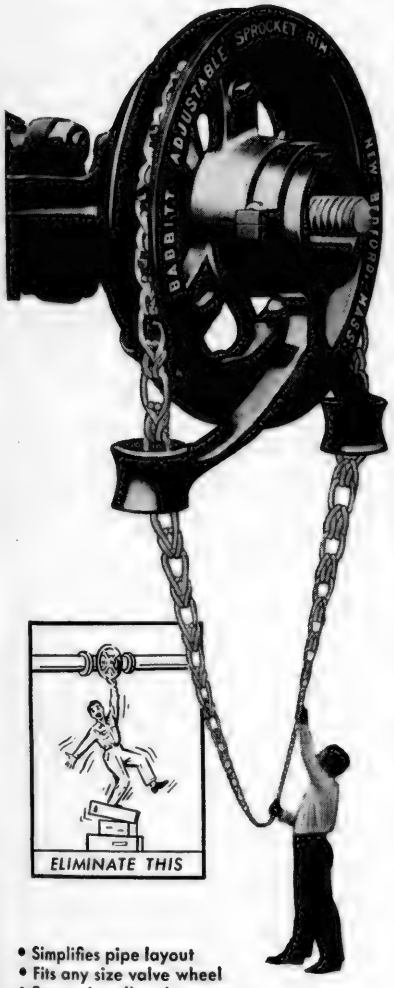
ASHAE MEETING—66th annual meeting of the American Society of Heating and Air-Conditioning Engineers, and the 2nd Southwest Heating and Air-Conditioning Exposition, sponsored by ASHAE, in Dallas, Tex. The meeting will be at the Baker and Adolphus Hotels, and the Exposition in the Memorial Auditorium. Secretary of the Society, 62 Worth St., New York 13, N. Y. .. **FEBRUARY 1-4, 1960.**

SAFE OPERATION OF OVERHEAD VALVES

with a

Babbitt

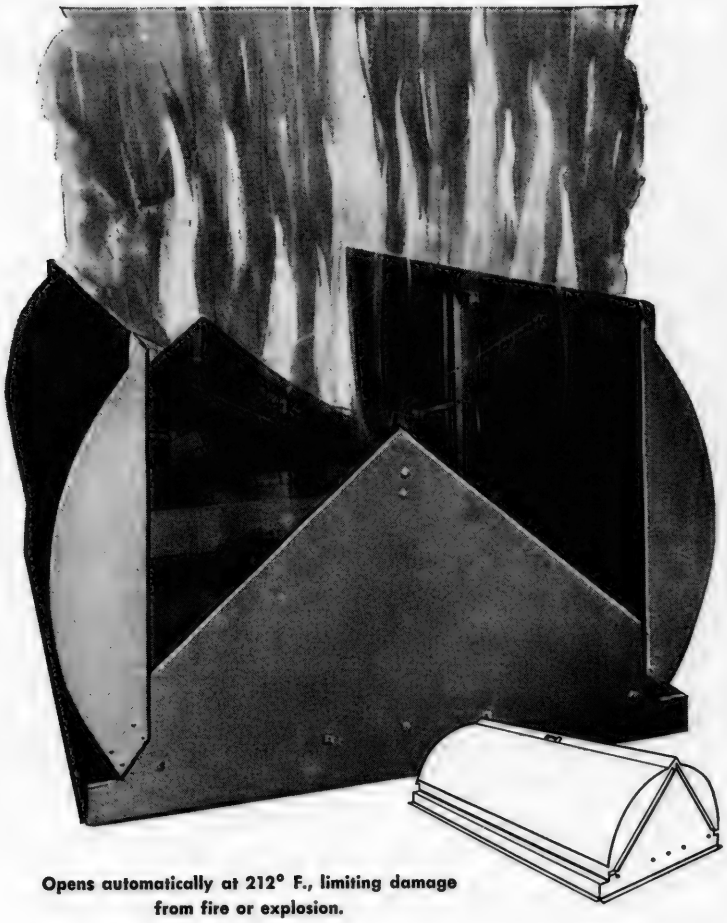
Adjustable
SPROCKET RIM
with Chain Guide



- Simplifies pipe layout
- Fits any size valve wheel
- Easy to install and operate
- Operates any valve from plant floor
- Time and money saving fixture
- No maintenance; first cost *only* cost
- Packed, completely assembled, one to a carton
- Hot galvanized, rust-proof chain available for all sizes
- Easy to follow instructions with each unit
- Your supplier carries complete stocks
- Write for new descriptive catalog sheet and prices

Babbitt STEAM SPECIALTY CO.

5 BABBITT SQUARE, NEW BEDFORD, MASS., U.S.A.



Opens automatically at 212° F., limiting damage from fire or explosion.

It's cheaper to burn up the sky than a plant!

When fire or explosion strikes a plant, Swartwout Pyrojectors open automatically . . . eject heat, flames, smoke through the roof instead of spreading them across the building. Pyrojector protection gives extra time for fire fighting equipment to arrive.

Pyrojectors are installed and operate entirely above roof level, yet extend only 28″ above curb. Fusible link mechanism opens 28 square foot vent when temperature reaches 212° F. Can also be opened instantaneously with release chain or from roof. Well insulated and weather tight, Pyrojectors can be opened for extra ventilation in summer.

Give your clients the protection they need, and increase your own profits, too. Write for complete information about Pyrojectors today.

The Swartwout Co.
Ventilation Engineering
18571 Euclid Avenue — Cleveland 12, Ohio

COMPACT . . LIGHTWEIGHT . . STREAMLINED AND ACOUSTICALLY EFFICIENT

NO JOB WAITS FOR

UNI-SILENCER

REG. U.S. PAT. OFF.

Single Unit Standard Uni-Silencer

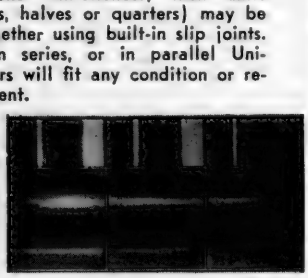
THE NEW SILENCER FOR AIR CONDITIONING AND VENTILATING SYSTEMS!

UNI-SILENCERS* and UNI-RESONATORS* have been designed specifically to reduce the airborne noise generated by fans in industrial ventilating and air conditioning systems.

UNI-SILENCERS* compare favorably in cost with conventional duct lining.

Low in cost from both the original purchase and installation view, Uni-Silencers are delivered in cartons weighing about 75 lbs. each. They may be easily and inexpensively transported into the building, to the specific location required.

When air flow, pressure drop, or noise attenuation require the use of more than one Uni-Silencer, then units (singles, halves or quarters) may be set together using built-in slip joints. Thus in series, or in parallel Uni-Silencers will fit any condition or requirement.



3 Uni-Silencer singles and 3 half units set together in a block

UNI-SILENCERS* are supplied in 3 sizes: Full Unit—24x24x32"; Half Unit—12x24x32"; Quarter Unit—12x12x32".

UNI-SILENCERS* are sold on a *guaranteed* basis. Interior and exterior surfaces are smooth, made of perforated and unperforated metal to reduce resistance to a minimum.

Complete engineering service is yours, FREE!

*Reg. U.S. Pat. Off.

Fill out and mail coupon for literature today!

ELOF HANSSON, INC., Acoustical Division
711 THIRD AVE., N.Y. 17, N.Y. Dept. U2-JU

Please send complete literature on Uni-Silencers and Uni-Resonators, without charge or obligation.

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ADDRESS .....

CITY .....ZONE...STATE.....

CLASSIFIED ADVERTISING

Sold at $12 per column inch.

DESIGN ENGINEER

We seek the services of a highly qualified engineer thoroughly experienced in the design of air-conditioning and refrigeration equipment and systems.

Our Company is an established multi-plant manufacturer with Mid-Western general offices and doing business on an international scale. This opening represents a ground-floor opportunity in our proposed diversification program.

The bachelors degree, 12 years experience and a thorough knowledge of the field constitute the minimum requirements Salary will be commensurate with proven ability. Benefits include Company paid hospitalization, life insurance, retirement and profit-sharing.

Submit complete resume in confidence to Box 923, Air-Conditioning, Heating and Ventilating, 93 Worth Street, New York 13, New York.

PRINTED FORMS available for immediate shipment. Heating & oil burner materials form, burner service record cards, service order forms, inspection information form, survey sheet and others. Also can supply BURNER SERVICE form in 8 part EZE-SNAP with 2 carbons in each set, 1200 sets IMPRINTED with your name, address and telephone, only $20.40. Send for samples—no obligation. Write Dept. AC, Degree Day Systems, 39-30 58th St., Woodside 77, N. Y.

MANUFACTURERS' AGENTS

An established manufacturer with 25 years experience producing ventilating equipment is looking for manufacturers' agents in many sections of the country to sell their new line of industrial fans. The products include axial flow and tubeaxial fans, both direct and belt driven, and power roof ventilators.

Please reply Box 914, Air Conditioning, Heating & Ventilating, 93 Worth St., New York 13, N. Y.

CONSULTING ENGINEERS

Principal of Massachusetts office with professional, management and sales background experienced in handling projects from client contact to completion but relatively new in private practice is interested in undertaking a branch office for established firm. References available. Reply Box 921, Air Conditioning, Heating & Ventilating, 93 Worth St., New York 13, N. Y.

MANUFACTURERS' AGENTS

Territories available in Connecticut, Idaho, Illinois, Kansas, Kentucky, Montana, Nebraska, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Wisconsin, Wyoming, for men experienced in selling central plant conditioners, multi-zone units, coils, etc., in the mechanical contractor field. Write Thermal Engineering Corp., Manufacturers, P. O. Box 13254, Houston 19, Texas.

see our advertisement this issue on page 32

INDUSTRIAL SALES MANAGEMENT

Challenging opportunity for young aggressive man to establish and direct product Development and Pricing Strategy for an aggressive growth-minded Rhode Island Manufacturer of Industrial Pumps, Heat Exchangers, and residential heating equipment.

Requires technical college training, with a minimum of 5 years' industrial marketing experience in product planning, marketing research, sales planning, or advertising and sales promotion.

Send resume with complete information including salary history to Box No. 922, Air Conditioning, Heating & Ventilating, 93 Worth St., New York 13, N. Y.

MANUFACTURERS AGENTS, Midwest manufacturer with 30 years experience producing chemical process equipment including ventilation, fans, scrubbers, and heat transfer equipment desires additional representation in Michigan, Texas, Louisiana, Carolinas, Georgia, and Kansas areas. Give full particulars. Write Box 924, Air Conditioning, Heating & Ventilating, 93 Worth St., New York 13, N. Y.

WANTED MECHANICAL ENGINEER for architectural and engineering office to do design of heating, ventilating, air conditioning, power plant, piping. Must have consulting office background and minimum of 8 years experience. Box 925, Air Conditioning, Heating and Ventilating, 93 Worth St., New York 13, N. Y.

ASSISTANT TO CHIEF ENGINEER

Engineer to assist Chief Engineer in air conditioning system analysis, preliminary design, engineering sales contact with Armed Services and manufacturers of Air Conditioning and Refrigeration components. Minimum 5 years design and/or engineering sales experience. New York City location. Send resume to Box 885, Realservice 110 W. 34 St., N.Y.C.

PROJECT ENGINEER

Rapidly expanding Manufacturer of Air Conditioning & Refrigeration systems requires aggressive Project Engineer to supervise design and testing activities on specialized industrial equipment. Position involves research and development, engineering liaison with other manufacturers. Minimum 5 years design experience required. Middle Atlantic States location. Send resume to Box 884, Realservice, 110 West 34th St., N.Y.C.

INSULATION

Rep. wanted by distributor and fabricator of fiber glass insulation and pipe covering, located in N.Y.C. Must have some following among firms like sheet metal, refrigeration, insulation contractors, air conditioning contractors or unit mfrs. Do not object to non-conflicting side line. Box 926, Air Conditioning Heating & Ventilating, 93 Worth St., New York 13, N. Y.

MANUFACTURERS REPRESENTATIVES

This magazine has many requests from manufacturers seeking representatives to handle their line of products. Why not register your name and lines desired with us and thereby be eligible for additional contacts? Write to Suno Larson, Research Director.

AIR CONDITIONING, HEATING & VENTILATING

93 Worth St. New York 13, N. Y.

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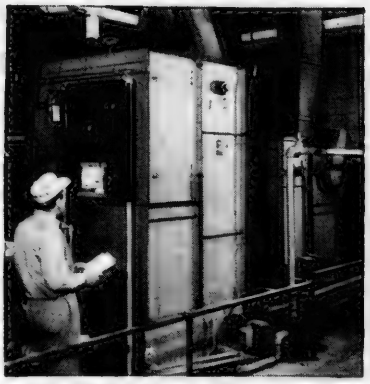
DRY and CLEAN AIR at the RIGHT TEMPERATURE

- to control your product quality
- to protect a critical operation
- to protect apparatus from moisture damage
- to DRY your material or product
- to control packing or storage conditions
- to assure precision in testing or research
- to increase air conditioning capacity



Air Condition by the NIAGARA Method Using HYGROL Liquid Absorbent

This compact method, giving high capacity in small space, removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the air.

Most effective because... it removes moisture as a separate function from cooling or heating and so gives a precise result, and always. Niagara machines using liquid contact means of drying air have given over 20 years of service. The apparatus is simple, parts are accessible, controls are trustworthy.

Most reliable because...the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions... no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.

Most flexible because...you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

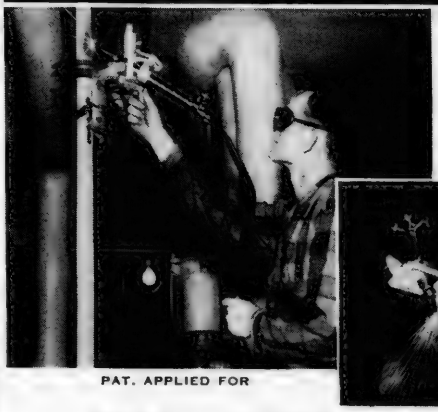
Write for Bulletins 112 and 131 and complete information on your air conditioning problem.

NIAGARA BLOWER COMPANY

Dept. HV-6, 405 Lexington Ave., New York 17, N.Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Decrease pipe welding expense with H & M Pipe Cutting and Beveling Machines



PAT. APPLIED FOR

COMPLETE ACCURACY WITH UNSKILLED LABOR

H & M Model "O" in action

Precision cuts and bevels are literally "cranked out" with an H & M machine, even when operated by your most inexperienced workman. The H & M Pipe Cutting and Beveling Machine is completely portable and extremely easy to operate, with a design that stresses speed, accuracy and durability.

H & M equipment will save enough time and labor in the pipe cutting and beveling phase of your welding operation to greatly reduce your overhead and increase your profits. Available in sizes to fit 1½" to 36" pipe.

FULL DETAILS AVAILABLE IMMEDIATELY

H&M TM REG

PIPE BEVELING MACHINE COMPANY
311 E. Third St. Diamond 3-0241
TULSA, OKLAHOMA

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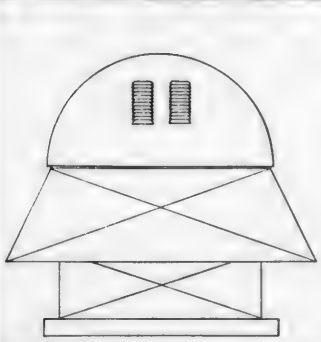
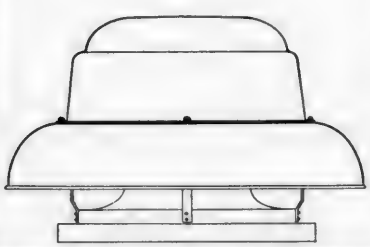
new LC* dynafans by PENN





Penn's new Low Contour Dynafans now offer unlimited possibilities for architectural building designs where streamlined silhouettes are desired.

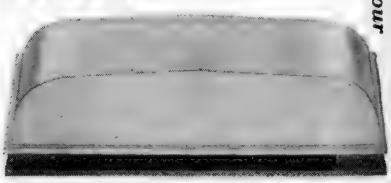
Reduced in height to almost one-half the size of conventional exhausters, this versatile unit contains all of the important features found in Penn's standard model LVQ (Low Velocity Wheel Design) units plus many improvements for lengthening unit life due to new straddled bearing design.

Complete performance data and technical information can be had by writing for Dynafan Bulletin PD-42LC or contacting the Penn Ventilator man in your area.

REDUCE ROOF EXHAUSTER HEIGHTS

ALMOST ONE HALF!

*low contour

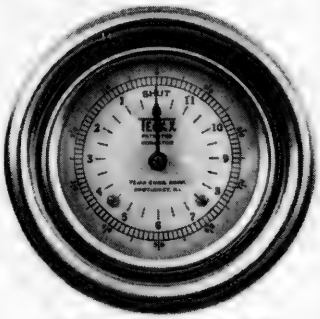


PENN VENTILATOR CO., Inc.
Philadelphia 40, Pa.

Representatives and distributors in principal cities
Charter member of AMCA

OPEN? HALF OPEN? SHUT?

KNOW FOR SURE WITH TEJAX



DIAL INDICATING HANDWHEELS

TEJAX Dial Indicating Handwheels give you accurate, efficient control of valves, shutters, dampers, or any equipment controlled with a rotary or screw motion. Exact readings in turns and fractions of turns are clearly indicated, easily read at a distance. You can return to predetermined settings without guess-work, and duplicate the same results every time. Positive gravity bearing mechanism is rugged, yet accurate, making TEJAX Indicators applicable to any stem or shaft placed in a horizontal position. Replace your regular handwheels with TEJAX Indicators and solve your control problems wherever precise, easily duplicated settings are necessary for efficient, economical operation.

WRITE FOR BULLETIN HV-6 ILLUSTRATING THE COMPLETE RANGE OF SIZES AND TYPES FOR EVERY APPLICATION

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PAWTUCKET, R. I.

LINDHOLM B
RUTLAND, VER

an actual unsolicited letter from ALEX LINDHOLM RUTLAND, VERMONT

Bethlehem Foundry and Machine Co.
Bethlehem, Pa.

Dear Sir:

We are writing you to tell you how pleased we have been for the past several years with Bethlehem heating equipment, engineered, sold and installed by the Maccabee Distributors, Inc.

For your information, at our Diner, which has served as many as eighteen hundred persons a day, our entire water heating is furnished by the instantaneous coil directly attached to our fixtures. The main Diner is also heated by steam from this same Dynatherm, and we find our oil operating expense including a small warm air furnace for our Dining room is one dollar and eight cents per day at the present rate of fourteen and eight tenths cents per gallon.

Needless to say we are extremely pleased.

We would further like to add that by using two of your large size forced warm air furnaces your engineer saved nearly one thousand dollars on [illegible] one hundred fifty by fif[illegible]

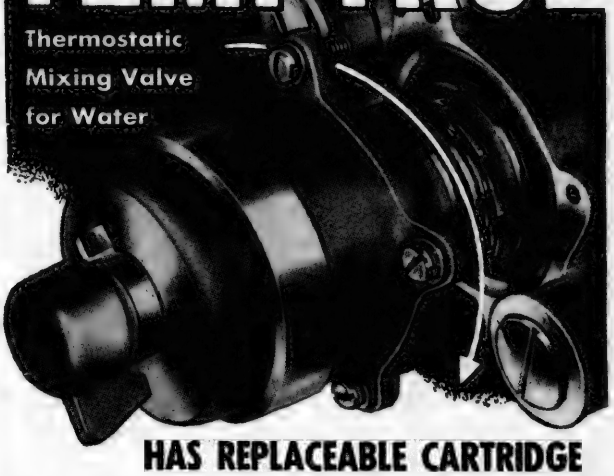
customers the country over have found the same remarkable performance from . . .

The Bethlehem **DYNATHERM**

exclusively engineered
HEATING UNIT that will PAY FOR ITSELF IN 5 YEARS! Proven fuel savings over 30%
WRITE TODAY FOR EXCLUSIVE DEALERSHIP
BETHLEHEM FOUNDRY & MACHINE COMPANY, BETHLEHEM, PA.

NEW FAIL-SAFE Symmons TEMPTROL

Thermostatic Mixing Valve for Water



HAS REPLACEABLE CARTRIDGE

TEMPTROL – the new and only fail-safe thermostatic water mixer available with these outstanding features . . .

REPLACEABLE CARTRIDGE – which houses all working parts.

INSTANT SERVICE – Temptrol, with check stops, need never be removed from the line for costly servicing. A screwdriver to remove but four screws permits one to slip in new cartridge, if necessary—quickly—safely.

CONSTANT TEMP – hot water temperature is continuously and accurately maintained at all times.

ADJUSTMENT – temperature range from 90° all the way up to 180°.

AUTOMATIC – instant compensation for supply line temperature and pressure changes . . . safely shuts down on hot or cold failure.

INSTALLATION – can be installed at the heater as a Master Control, or anywhere along the line as a Zone Control.

CORROSION FREE – stainless steel control unit and electrolized sleeve assure extra long life and trouble-free performance.

ADDITIONAL PROTECTION – solid fill thermal element mounted out of the water in protected chamber open only to atmosphere.

AVAILABLE NOW – in four sizes: ¾", 1", 1¼" and 1½".

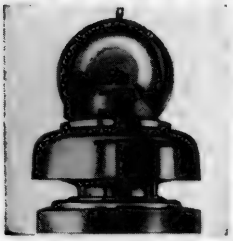
Truly a non-competitive item.

See SWEET'S ARCHITECTURAL FILE, DOMESTIC ENGINEERING CATALOG or write us direct for further information

Symmons ENGINEERING COMPANY
445 C STREET, BOSTON 10, MASSACHUSETTS

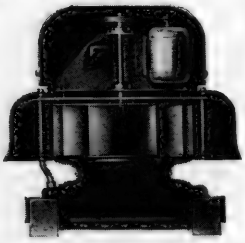
Uniform appearance

All-aluminum construction, in COOK belt and direct drive models



Belt Drive Centrifugal Model CB, Capacities to 13,939 cfm

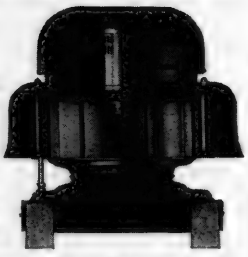
Even Drive Assembly Is All-Aluminum No Steel.



Only 39" high in largest size. Adjustable sheaves give wide choice of tip speeds and cfm. Light starting torque with all-aluminum blower wheel. 13,939 cfm size weighs only 280 lb.

Direct drive Centrifugal Model CD, Capacities to 10,263 cfm

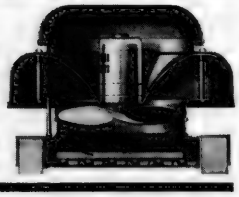
Ample air supply to motor chamber.

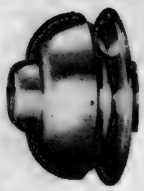


All aluminum, even solid aluminum supporting posts. Discharge direct—no additional static created. Motor assembly vibration isolated. Non-overloading, aluminum wheel.

Direct Drive Propeller Model FD, Capacities to 4,020 cfm

Pressure type aluminum propeller. Deep spinning means unrestricted air flow. Power assembly floats on vibration isolators. Venturi-type outlet prevents backdraft.

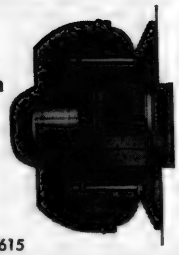


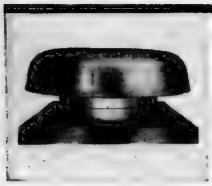


Direct Drive Wall Ventilator Model W, Capacities to 2,580 cfm

Outer baffle makes unit completely weatherproof. From 7" to 18" wheel—all aluminum—backwardly inclined. Weatherproof sealer on mounting flange. Round duct work is easily attached.

Patent No. 2805615





Pressure Relief Ventilator Model PR, from .1964 to 5.157 square foot throat area

Inverted cone guides air flow—reduces turbulance.

Large outlet area reduces pressure loss.

One-piece spun aluminum weatherproof top cap.

One piece spun aluminum base.

Ratings in accordance with standard test code by Texas Engineering Experiment Station, an approved AMCA test laboratory.

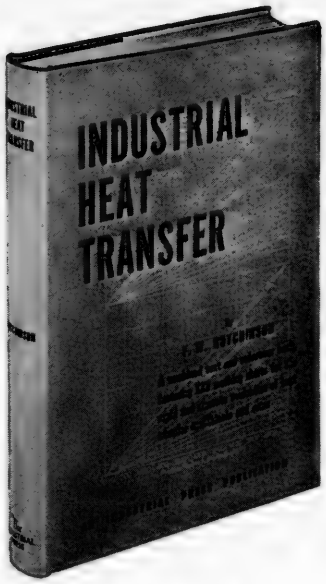
Write for Catalog, or see our condensed catalog 20c/CO in Sweet's Architectural File.

COOK **LOREN COOK COMPANY**

Berea, Ohio

In Canada write to H. F. Clarke, Ltd., 421 West Broadway, Vancouver, B. C

Ventilators CB, CD & W are CSA Approved



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336 Pages, 136 Charts and Illustrations—$7.00

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NAME .....

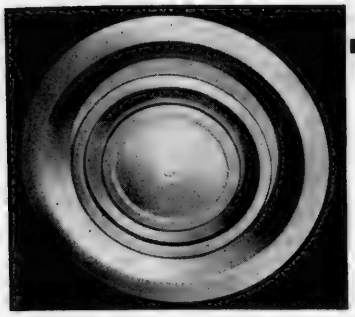
COMPANY .....

CITY ..... ZONE.... STATE .....

HOME ADDRESS .....

(Please fill in if you want book sent to your home)

ACHV 6/58



ALL ALUMINUM DIFFUSER

WITH ADJUSTABLE PATTERN

Silentair

SUMS UP YOUR AIR DISTRIBUTION NEEDS!

WHAT'S NEW ABOUT THIS DIFFUSER!

1 All aluminum construction.

2 Internal vanes for segmental air pattern adjustment, which is stable in intermediate angles — ceiling or duct mounted.

3 Choice of air movement control from any one or combination of diffuser quadrants.

4 Choice of conditioned zone temperature and humidity control variations as required . . . independently in any one, or combination of four regions served by a single diffuser.

THESE ARE YOUR BENEFITS!

► 1 No corrosion problem.

► 2 Identical and harmonious outward appearance for fixed (CF), adjustable (CA) or combination supply-return (CR) diffusers.

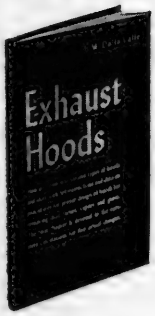
► 3 In "comfort" applications . . . satisfies the "outdoor" type as well as the "sheltered" individual in choice of air movement.

► 4 Simplifies air balancing for comfort or industrial applications by permitting quick, positive temperature and humidity control by putting air where it's needed.

COMPLETE ENGINEERING DATA AVAILABLE . . . WRITE FOR SILENTAIR BULLETIN C-100

GENERAL AIR PRODUCTS CORP.
14-40 FACTORY STREET • CEDAR GROVE, NEW JERSEY

EXHAUST HOODS



The only book published that gives comprehensive information on the flow of air around and into the openings, hoods or slots in exhaust ventilating systems. Covers all phases of hood, booth and slot design. Shows how to determine the required air volume and velocity for hoods and other types of openings for the control of all kinds of dusts, fumes and gases. Sample problems, with the solutions worked out in detail, are given in a chapter devoted entirely to this matter.

141 Pages, 127 Illustrations, 30 Tables, $4.00

THE INDUSTRIAL PRESS

93 Worth Street New York 13, N. Y.

Elgo Ventilating Specialties

NEW!
EXTRUDED ALUMINUM SHUTTERS

Shutters of modern design which give you ALL of these features: Lightweight, Full Weather Strip, Low Freight Cost, Easier installation, Concealed Pivot Pins, Rust and corrosion Proof and Natural aluminum finish with fluted frames.

Write for complete specifications.

Free CATALOG

ELGO SHUTTER & MANUFACTURING CO.
Dept. 1, 2738 W. Warren Detroit 8, Michigan

HARRIS

for any liquid—for high pressures—for high temperatures

Write today for Harris Float Catalog with complete technical data.

If you have a liquid level control problem that involves a float, send for Harris Float Catalog with its complete technical data on the various types and sizes of floats, and the metals suitable for different corrosive liquids, temperatures, and pressures.

Harris Floats are made in sizes from 2½" to 14" diameter in ball, cylinder, conical, rectangular or disk shapes of Copper, Stainless Steel, Aluminum, Nickel, Monel, or Steel or other suitable, workable metals.

Harris engineers, with a background of 72 years of experience, will be glad to help you select or design the right float for your installation.

ARTHUR HARRIS & CO.

206 No. Aberdeen Street, Chicago 7, Illinois

FLOATS

"This sheet has just the right stiffness and ductility"

He's talking about a sheet of Bethcon galvanized steel, and his enthusiasm is shared by an ever-growing number of sheet-metal workers.

Bethcon has that very desirable combination of stiffness and ductility because of Bethlehem's up-to-the-minute continuous galvanizing lines, which include a continuous annealing process. This treatment turns out sheets which are easy to work into a strong, rigid sheet-metal product.

Bethlehem's continuous galvanizing process bonds the zinc to the steel so tightly that it virtually eliminates peeling or cracking of the coating. Even when you double the sheet back on itself, the zinc stays put. The coating is uniform, too, both in appearance and in thickness. Since a Bethcon sheet has no drip end, it has no bothersome bead.

You can order Bethcon in 13-gage and lighter, in either plain open-hearth or copper-bearing steel. A Bethlehem representative will gladly call to discuss your sheet-metal operations with you, and to give additional information about Bethcon. Just call or write to the Bethlehem sales office nearest you, or write to the address below.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation.

BETHLEHEM STEEL

NEW T&P RELIEF VALVE..... is ASME, AGA rated at 500,000 Btu per hr capacity with highest possible value built in. Attractive price. Complete information available.
Inside Front Cover — Item 200

UNIT TRAPPING EXPLAINED..... in advertisement by steam trap manufacturer entitled "Why Every Steam Heated Unit Needs Its Own Steam Trap." The theory and practice of unit trapping for top temperatures explained. Reprint of article on unit trapping and 44-page steam trap book offered.
Page 1 — Item 201

YEAR-ROUND HYDRONIC UNIT..... is offered for peak comfort and practicality. Same distribution piping, winter or summer. Heats and cools with water. No duct work. Bulletin available.
Page 2 — Item 202

HEAT EXCHANGER INFORMATION... analyzes the many factors that affect the efficiency, maintenance and service life of heat exchange coils. For best performance in your own application, take advantage of the engineering research and design skill which company offers.
Page 5 — Item 203

"HEAT FLOW BY RADIATION" BOOK explains how solar rays which strike the outside of the building become heat rays which oppress those inside; why white paint and other white surfaces in enclosed places perform no better than black.
Page 7 — Item 204

FREE CADDY WRENCH..... is offered with purchase, from June 1 to August 1, of cylinder of this company's very dry refrigerant. All purpose wrench is also a carrying tool. Information on refrigerants available.
Page 9 — Item 205

VIBRATION-FREE PERFORMANCE.... of ventilating equipment is the most important factor in selection, 9 out of 10 consulting mechanical engineers state in survey. Company's direct-connected models are vibration free as it is possible to be. Catalogs offered.
Pages 11 thru 13 — Item 206

TOP QUALITY COPPER TUBE..... results in repeat orders by contractors. Every executive of this company, from the president down, is ready for any emergency request. Red tape is cut. Information available.
Page 15 — Item 207

A THERMOSTAT IN EVERY ROOM.... with this company's heating system provides economical and practical steam heating with individual room-by-room temperature control. Modulating, not on-off, cycling. Specifications offered.
Page 17 — Item 208

LEARN WHY BRASS VALVES..... of this company's manufacture end excessive shutdowns for repairs. Booklet on bronze valves with composition discs shows why they are so economical for service on steam, hot or cold water, oil or gas.
Page 18 — Item 209

HIGH-CAP, DUAL-DUCT MIXERS..... called turbulators are standardized, constant volume, high capacity units handling from 800 to 7000 cfm. An economical solution to air distribution problems in which a large volume of air at controlled volume or pressure, and temperature is involved. Bulletin gives engineering data.
Page 19 — Item 210

Circle numbers corresponding to the items and advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

Below and on the following pages are given brief digests of the advertisements appearing in this month's issue. Use this Digest to locate and refer to the advertisements in which you are particularly interested, then fill out and mail the prepaid postcard to request further information from manufacturers.

The items appear in the same order as the advertisements to which they refer, to facilitate obtaining further information after reading an advertisement.

NOTE: All advertisements are digested here except those received too late for inclusion. The index of Advertisers lists all the advertisements in this issue.

Use the postcard below for catalogs, new equipment and materials, as well as Ad-Digest items.

TEMPERATURE REGULATORS..... with packless construction have advantages which include the elimination of repacking problems, lower maintenance, and accuracy of regulation. This company's units are guaranteed not to wire-draw. A bulletin with piping layouts is available.
Page 20 — Item 211

WARM AIR INDUSTRIAL HEATERS.. are available in ratings up to 2,000,000 Btu per hr featuring 4-pass counter-flow design. Double casing with metal radiation shield, stainless steel combustion chamber, and a single master control. Complete specifications and engineering data available.
Page 21 — Item 212

SPECIAL EXPANSION JOINTS..... are second nature to this company who pioneered packless joints for special work. Much experience from many special orders enables the company today to design quickly and accurately. Information available.
Page 22 — Item 213

REFRIGERANT DISTRIBUTORS..... have a well-known interchangeable nozzle which permits easy capacity control either at the factory or on the job. Coil manufacturers stock coils with distributors attached, then select proper nozzles upon order. Information available.
Page 23 — Item 214

NEW BOILER, OIL HEATING UNIT.... is I-B-R tested and rated for capacities of 1300-3260 sq ft steam, and 2255-5290 sq ft water. Provision for single or dual water heaters. Bulletin gives complete description and engineering data.
Page 24 — Item 215

MOTEL SOLVES NOISE PROBLEM.... by changing to this company's universal pump for circulated-water heating and cooling system, which required corrective measures because conventional pump produced motor hum and water noise which was transmitted through the unit in the motel rooms. Information available.
Page 25 — Item 216

INQUIRY CARD

Circle below item numbers on which you wish catalogs or further information

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PLEASE PRINT June H-58

This service available only to U.S. and Canadian readers.

Name .....

Title or Job Function .....

Firm .....

Nature of Firm's Business .....

Street .....

City .....**Zone** ....**State** .....

This card is void after Sept. 1, 1958

SCHOOL HEATING COST CUT 21%.... with two of this company's 75-hp automatic boilers firing No. 5 oil to heat three adjoining school buildings from a central plant. Literature available on oil or gas models, available from 20 to 600 hp.
Page 26 Item 217

COMPLETE CONDITIONING LINE..... includes floor, ceiling, hideaway, horizontal and basic types, provides greatest flexibility, efficiency, and economy. Information available.
Page 27 Item 218

COMPRESSORS IN ALL SIZES..... are available to cool air, chill water, make ice, or for extremely low temperatures, or for refrigeration, quick freezing, and processing. Company provides recommendations and estimates. Information available.
Page 28 Item 219

TROUBLE-FREE MOTOR CONTROLS.. made by advertiser are selected for very many of the larger air conditioning installations because of their recognized reputation for long, trouble-free life. Simple solenoid design has only one moving part. Bulletin available.
Page 29 Item 220

NEW AUTOMATIC AIR FILTER..... retains all the features of company's Roll-O-Matic, but has stronger media, operates more simply, is easier to maintain and handles more CFM. Corrosion-resistant construction. Bulletin available.
Pages 30-31 Item 221

HEATING, VENTILATING CATALOG.. describes a complete line of central plant and multi-zone conditioners, sprayed coil units, heating and ventilating units, heating and cooling coils, and air cooled condensers.
Page 32 Item 222

END WATER LEVEL WORRIES..... in medium pressure boilers with company's combination that includes pump control and make-up feeder. Company offers simple installation and wiring diagrams covering every condition.
Page 33 Item 223

DRY CONDENSING CATALOG..... describes standard air-cooled condensing systems up to 540 tons and units for heat pump applications with no horsepower limitation. Practically no maintenance.
Page 34 Item 224

TRAPS PREVENT STEAM WASTE..... because they are designed to function more effectively and economically in removing condensate from steam lines and equipment. Catalogs describe bucket, F&T, or thermostatic traps.
Page 35 Item 225

TROUBLE-FREE SOLENOID VALVES.. are available for every refrigerant control application: liquid, suction, hot gas, brine, water, steam, or air. Compactly constructed of corrosion resistant materials to precision standards. Bulletin available.
Page 36 Item 226

HTW HEAT EXCHANGERS..... put high temperature water to work. Complete line for industrial and process application includes convertors, fuel oil heaters, steam evaporators, vertical units, waste heat reclaimers, and distillation plants. Information available.
Insert bet. 36-37 Item 227

HOLD AIR CONDITIONING COSTS..... by specifying this company's line. You get the right equipment (over 297 models), low operating cost, low maintenance cost. Brochure details the full facts on secret costs of air conditioning.
Page 37 Item 228

FIRE HOSE CABINETS..... are called the greatest improvement in standpipe type fire protection in fifty years. Uses 35% less area, cuts cost to 30%, with many other features. Check book for specifying non-sprinkler fire protection (not a catalog) offered.
Pages 38-39 Item 229

ONE ORGANIZATION OFFERS BOTH.. automatic controls and air distribution products, coordinating products and service at the design stage, during installation, and for final balancing of air distribution. Information available.
Pages 40-41 Item 230

TRAPS CUT FUEL BILL 25%..... at Sheaffer Pen plant. Some areas of building could not be brought up to comfortable temperatures. Company's traps chosen after investigation of six competitive models. Traps found excellent for processing operations, too. Booklet gives complete story.
Pages 42-43 Item 231

COOLING WITH GAS ..... provides years of trouble-free comfort when the manufacturer's gas absorptive cooler is specified. This cooling can put commercial and industrial heating plants on a year around paying basis. Information is available.
Pages 44-45 Item 232

"TAILOR-MADE" H&V SYSTEMS..... are made with standard units. Sectional construction of basic components provides required capacity at savings in time, money, and space. Bulletin available.
Pages 46-47 Item 233

AIR CONDITIONING CONTROL SYSTEM manufactured by advertiser helps Continental Can Co. Research produce the newest ideas in modern containers. Various areas held between —10 deg F and 130 deg F, all provided with individual space control. Information available.
Pages 48-49 Item 234

HIGH-PROFIT CONDITIONING LINE.. features maximum dependability, customer satisfaction, pre-sold prospects (national advertising beamed at virtually every prospect), and priced competitively with generous profit margin. Information available.
Page 50 Item 235

HOT WATER STORAGE HEATERS.... at Virginia's Jamestown Festival, where more than 2 million visitors will walk back through 350 years, will have the comforts provided by cement-lined hot water storage heater for reception center, gift shops, restrooms, and taverns. Catalogs available.
Page 51 Item 236

CUSTOM-ASSEMBLED PUMP LINE.... is suitable for 99% of all air-conditioning applications because they are assembled for your application from standard components. A tailored pump at a mass-produced price. Information available.
Page 52 Item 237

MOTORS GIVE MORE PROTECTION... and are designed to meet more application needs. Totally enclosed units give extra protection against corrosive, abrasive, or explosive elements. Dripproof motors give double protection against corrosion, and falling or splashing liquids. Bulletin available.
Insert bet. 52-53 Item 238

QUALITY ZINC-COATED STEEL..... will match the specifications of heating or air conditioning duct work as no other metal can. Remarkable strength and rigidity. Booklet available.
Page 53 Item 239

QUIET SOLENOID VALVES..... are offered for dependable control of air conditioning. Used in every guest suite in Miami's newest luxury hotels. Information available.
Page 54 Item 240

PIPE INSULATION SNAPS ON..... resulting in an easier-to-apply material. Permanent. Comes in 3-ft and 6-ft sections, plain or jacketed, for all cold or heated lines to 33 inches. Information available.
Page 55 Item 241

"TAILOR-MADE" ELECTRIC MOTORS are custom engineered at standard motor prices for the product they are designed to power. It is no longer necessary to design a product around a standard motor. Information available.
Page 56 Item 242

QUIET AXIAL FLOW FANS..... have inherent efficiency further improved by vaneaxial outlet guide vanes which redirect air for increased forward thrust. Duct-size units save space. Bulletin available.
Page 57 Item 243

LOW CONTOUR EXHAUSTERS..... are unique in that their installed height is several inches lower than other typical competitive units. This may amount to 8 or 10 inches. Information available.
Page 58 Item 244

HEATING AND COOLING COILS..... of this manufacturer are better because of air activating guides. More prime surface than any other coil. New application manual with complete data for consulting and designing engineers offered.
Page 59 Item 245

HEATING SPECIALTIES CATALOG.... details many products by this well-known manufacturer of which many engineers are unaware. Includes: Packless radiator valves, thermostatic radiator traps, F&T traps, vents, boiler gages.
Page 60 Item 246

BIG GENERAL PURPOSE FANS..... provide big performance for process and ventilating applications. Self-contained, in 12 sizes, in four types. Bulletin available.
Page 61 Item 247

Postage Will be paid by Addressee

No Postage Stamp Necessary If Mailed in the U. S.

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 52, SEC. 34.9, P. L. & R., NEW YORK, N. Y.

AIR CONDITIONING, HEATING AND VENTILATING
93 WORTH STREET
NEW YORK 13, N. Y.

AD-DIGEST SERVICE

CENTRIFUGAL WATER CHILLER..... will cut air conditioning costs because it is rugged and dependable. Provides refrigeration needed automatically and cuts power costs to the bone. Complete facts available.
Page 113 Item 248

THREE LINES OF WATER COOLERS.. available. Compact, standard, and remote types. Feature uniform-pressure, splash-proof drinking. Catalog contains complete information on each model plus data on new hot and cold water dispensers.
Page 116 Item 249

CONDENSATE PUMP AND RECEIVER features quiet, vibrationless operation, low return and easy accessibility. Dependable under all types of conditions and continual service. Operates at a wide range of pressures. Information available.
Page 117 Item 250

ROOF VENTILATORS ..... made by this company include a low contour model, a large volume model for high velocities, wind driven turbine types and exhaust fans for corrosive fumes. Catalog with specifications and performance data is available.
Page 118 Item 251

COPPER TUBES AND FITTINGS..... simplify plumbing because their light weight, long, standard lengths, and their compact, solder-joint fittings make them much easier and faster to install. Bulletin explains.
Page 119 Item 252

POWER-DRAFT INDUCER LINE..... for low cost heating plant power draft, and industrial exhausting. Up to 20 inches pressure for exhausting corrosive gases, abrasives, and paint spray. Engineering data bulletin offered.
Page 120 Item 253

EASY-TO-FIND DATA ON VALVES.... and how to select and use them are contained in new 296-page general catalog of well-known manufacturer. Includes: Specifications, instructions for choosing and using, useful tables and reference data. Request on letterhead.
Page 121 Item 254

LIQUID DEPTH INDICATOR BULLETIN describes romote reading units. Hydrostatic pressure principle. Like having transparent tanks. Bulletin available.
Page 122 Item 255

29% MORE COPPER DRAINAGE TUBE has been sold in the last two years as reports from contractors show installed cost to be lower than for rustable materials, and that installation is quicker and easier. A badge of quality construction. Data folder offered.
Page 123 Item 256

FASTENING DEVICES CATALOG..... describes items that bite into concrete in seconds and anchor anything permanently. Contains complete data on self-drilling expansion anchors, pin bolt drives, toggle bolts, and accessories.
Page 124 Item 257

SEAMLESS COPPER TUBE & PIPE.... is made of ageless copper, heavy-walled and durable, smelted to meticulous purity in company's own refinery. On-schedule deliveries. Information available.
Page 125 Item 258

HEAT EXCHANGERS FOR ALL JOBS.. are available to suit all requirements. Company's know-how will help you select the exchanger you can depend upon to do the right job. Complete information available.
Page 126 Item 259

PACKAGED WATER CHILLER..... series is designed to cut the costs and simplify the process of air conditioning. Eighteen to 246 ton capacity is the broadest range produced in the industry. Bulletin is available.
Page 127 Item 260

BRONZE VALVE LINE CATALOG..... details equipment involving 550 engineered designs. Bronze valves are this company's only product. Automated production results in high quality, moderate cost.
Page 129 Item 261

A STABLE DUAL-DUCT SYSTEM..... is achieved with air-mixing units and controls available from this manufacturer. Direct, automatic volume control. It is impossible to unbalance any zone in the system. Information on units offered.
Page 131 Item 262

RENEWING AIR FILTERS..... for restaurants, stores, hotels, and office buildings save money by reducing the amount of outdoor air required. Activated carbon plus electronic air cleaning is long lasting and six times more effective. Details available.
Pages 134-135 Item 263

PNEUMATIC VALVE AND MOTOR..... for mechanical systems uses new materials and new designs to increase performance for control of steam or water. Equal percentage throttling plug plus longer stroke gives better control at light load. Teflon cone packing lowers friction, requires less lubrication. Diaphragm design gives more power for smaller diameter. Information available.
Page 136 Item 264

THESE HOT WATER GENERATORS... are specifically designed for forced circulation systems. Distribute water evenly throughout the length of the pressure vessel. World-wide service organization. Folder offered.
Page 138 Item 265

COMPLETE-LINE CONDITIONING..... enables custom quoting on every job. Company is signing on a select group of new air conditioning dealers. Complete air conditioning story offered.
Page 139 Item 266

COOLING TOWER CATALOGS..... describe complete line for air conditioning, or cooling of manufacturing process fluids. A unit of correct capacity and type for every job.
Page 140 Item 267

FIBER GLASS TECHNICAL HELP..... is offered by manufacturer whose product may be your answer wherever noise or vibration, heat or cold presents a problem.
Page 141 Item 268

ALL TYPES OF VENTILATION..... problems are solved in efficient manner by complete line, certified performance, and competitive pricing of manufacturer's air moving equipment. Catalog is available.
Page 142 Item 269

CONDENSATE PUMPS & RECEIVERS.. service Dallas Memorial Convention Auditorium consisting of a main circular building seating 10,000 people, a theater building, and an underground exhibition hall. They never steam bind because pump suction is always under a head. Full details offered.
Page 143 Item 270

ROOF VENTILATOR DATA BOOK..... supplies quick data on company's complete line of modern roof ventilators. A type and size for every ventilating need.
Page 144 Item 271

A LOUVER RAIL COIL..... offered by this company is an economical and practical method for fabricating louvers. Removable, hinged, or stationary. Hundreds of variations possible.
Page 145 Item 272

TO PREHEAT HEAVY OILS..... to proper flow temperature before entering suction line company's preheater uses steam or hot water. Bulletin explains.
Page 145 Item 273

NEW SUPPLY PUMP EQUIPMENT..... to handle No. 5 and No. 6 furnace oils is offered. Direct drive units are motor driven at 900 rpm optimum speed. Capacities and pressures of belt driven sets can be varied. Additional information offered.
Page 145 Item 274

THREE UNIT HEATERS..... for modern business and industry: Suspended type is gas fired with choice of propeller fan or centrifugal blower; free standing, direct fired heaters for gas, oil or both; and duct type designed for assembly in custom engineered duct systems. Data are available.
Page 146 Item 275

Circle numbers corresponding to the items and advertisements in which you are interested, print your name and address clearly. Information will be sent directly from manufacturers.

INQUIRY CARD

Circle below item numbers on which you wish catalogs or further information

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PLEASE PRINT June H-58

This service available only to U.S. and Canadian readers.

Name .....

Title or Job Function .....

Firm .....

Nature of Firm's Business .....

Street .....

City .....**Zone** ....**State** .....

This card is void after Sept. 1, 1958

Ad-Digest

AMCA-RATED AIR MOVERS..... are built by charter member of AMCA and produced to AMCA standards. Backward curve blower and centrifugal roof ventilator are two in its expanded line. Bulletins available.
Page 147 Item 276

PACKAGED AUTOMATIC BOILER..... can give heat equivalent to boilers two or three times its physical size. Expressly designed for steam or hot water heating service. Integrally equipped with rugged, industrial-type oil or gas burner. Bulletin available.
Page 148 Item 277

GLASS FIBER DUCT INSULATION.... answers acoustical problems such as one where supply duct velocity was 3600 fpm, return duct 1200 fpm, with 8½ lb static pressure. Information available.
Page 149 Item 278

FLEXIBLE DUST EXHAUST HOSE.... is made of strong Neoprene-coated cotton or nylon fabrics spiral-wire reinforced. Hose is installed for dust control, particularly at elbows and moving hoods. Information is available.
Page 150 Item 279

MORE CFM FOR COOLING TOWERS... are available using this company's precision engineered fans with variable pitch blades and anti-flutter design, to give cooling at a lower cost. Information is available.
Page 150 Item 280

FORCED DRAFT FIRING SYSTEM..... available in one complete package for gas, oil, and for gas-oil combination. Available as boiler-burner unit, or as burner unit only to fit any boiler. Catalog and specifications offered.
Page 151 Item 281

COMPLETE LINE OF FILTERS..... are described in catalog covering electronic air types, automatically cleaning types and others for air conditioning and ventilating equipment, engines, compressors, or any device using air or liquids.
Page 152 Item 282

CENTRIFUGAL ROOF EXHAUSTERS.. enhance the beauty of building skylines with their low silhouette design. Forward or backward curve wheel within or out of scroll housing. Bulletin available.
Page 152 Item 283

CONTINUOUS STRIP DIFFUSERS..... are the only practical means for air curtaining plate glass windows or wall areas to counteract summer heat or winter chill that blends with interior. Can be hidden in lighting coves. Information available.
Page 154 Item 284

LOW-COST, ALL-PURPOSE AIR METER has high and low ranges to give direct velocity readings from 260 to 4000 fpm and static pressure readings from 0.005 to 1.0 inches of water. Comes complete with every accessory for adjusting and balancing air handling equipment. Fits in shirt pocket. Bulletin available.
Page 155 Item 285

FORCED RECIRCULATION UNITS..... made by this company have proven their superiority for high temperature water generation. The inherent advantages of HTW explained in bulletins available.
Page 155 Item 286

EVAPORATIVE CONDENSER ..... bulletin describes units that are hot-dip galvanized after fabrication. Company pioneered blow-through principle. Primary coil surface copper tubing.
Page 156 Item 287

ADJUSTABLE SPROCKET RIM..... with chain guide provides safe, floor level valve operation. Pipe layout is simplified, and any size wheel is fit. Descriptive catalog sheet is available.
Page 157 Item 288

ROOF VENTILATOR OPENS AT 212F.. automatically, limiting damage from fire or explosion. Installed to operate entirely above roof level, yet extends only 28 inches above curb. Full information available.
Page 157 Item 289

IN-DUCT SILENCER HUSHES FANS.. comparing favorably in cost with conventional duct lining, both from original purchase and installation view. Sold on a guaranteed basis. Complete literature available.
Page 158 Item 290

PIPE CUTTING AND BEVELING..... decrease pipe welding expense. Machines provide complete accuracy with unskilled labor. Out-of-round attachment cuts and bevels out-of-shape pipe with precision. Full information available.
Page 159 Item 291

DRY AND CLEAN AIR ..... at the right temperature is assured by the manufacturer's method, which removes moisture as a separate function from cooling and heating and so gives a precise result. Bulletins are available.
Page 159 Item 292

ROOF EXHAUSTER HEIGHTS CUT.... almost one half by this company's new low contour fans. New straddled bearing design. Complete performance data in bulletin available.
Page 160 Item 293

HEATING EQUIPMENT ..... from this manufacturer is providing satisfying performance to customers throughout the country. A Vermont diner gets water heating and steam heat from the same unit and oil operating expense is very low. Information is available.
Page 161 Item 294

FAIL-SAFE MIXING VALVE..... for water has replaceable cartridge which houses all working parts. Never needs to be removed from line for costly servicing. Corrosion free. Information is available.
Page 161 Item 295

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Page 161 Item 296

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Page 162 Item 297

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Page 163 Item 298

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Page 163 Item 299

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Page 163 Item 300

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Inside Back Cover Item 301

PNEUMATIC CONTROL CENTER..... permits operator to scan his panel and check key temperatures, pressures, and other data from up to 100 or more strategic control points in the building. No complex equipment to study and maintain. Information available.
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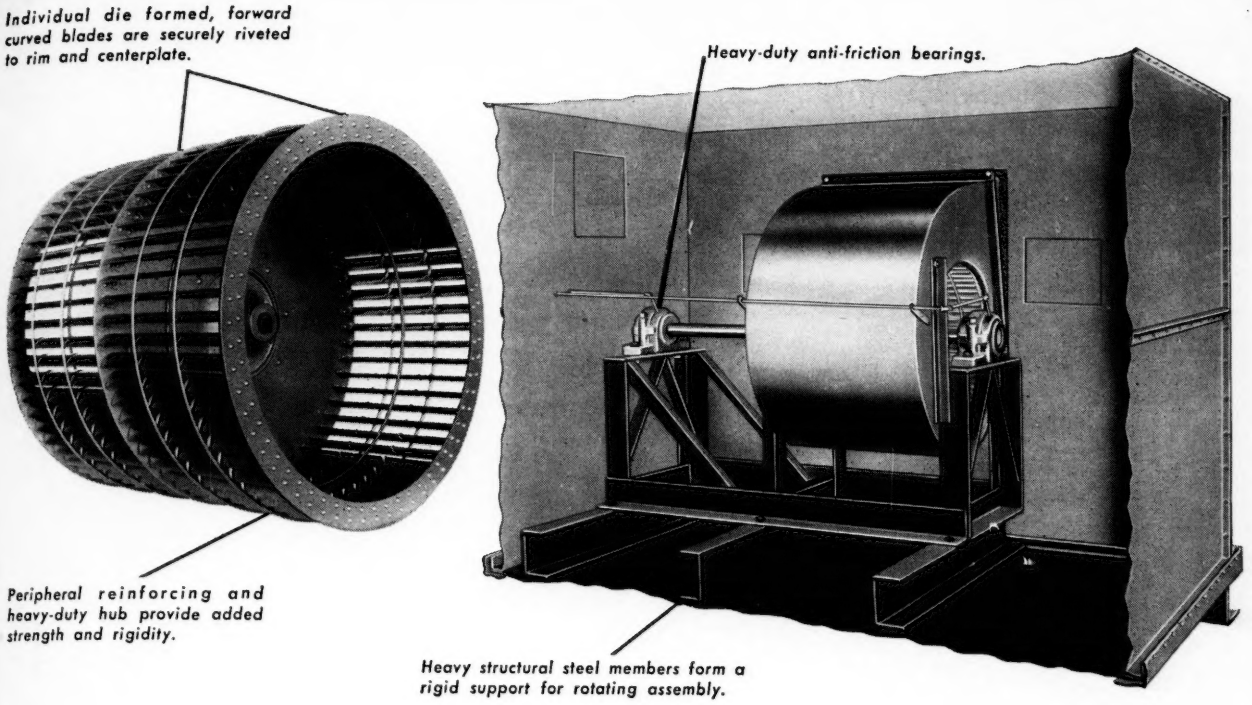
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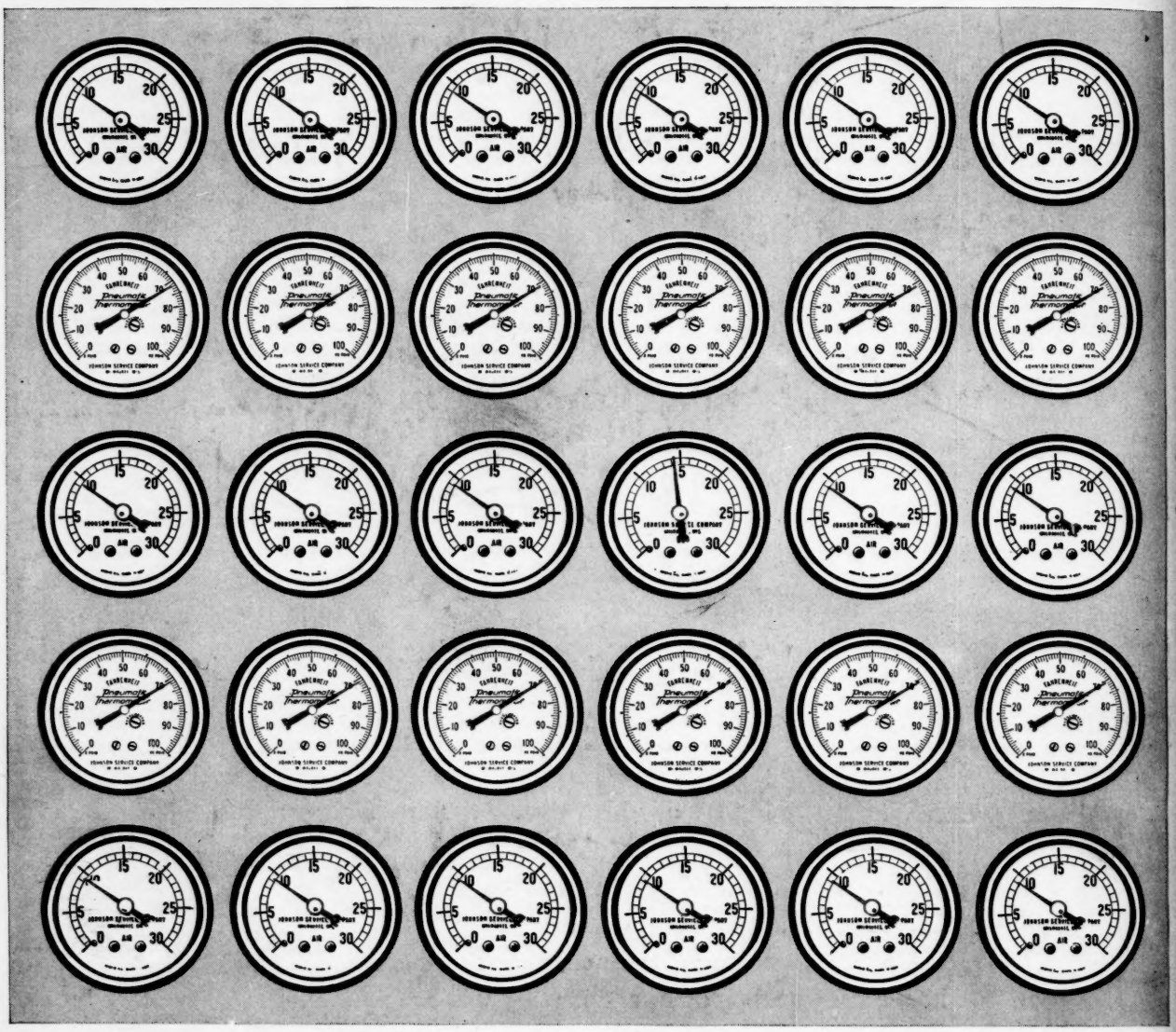

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